Vol. XIX JULY - SEPTEMBER 1971 No. 1

THE INDIAN ECONOMIC JOURNAL

'REGION' AS A DEVELOPMENTAL CONCEPT—M. H. Gopal 1

THE CONCEPT OF EXTERNAL ECONOMIES IN ECONOMIC DEVELOPMENT—
—Ismail Shariff 7

PRODUCTION FUNCTIONS AND THE ELASTICITY OF AVERAGE PRODUCTIVITY—K. V. S. Sastri 17

THE CONCEPT OF ECONOMIC DEVELOPMENT AND ALL THAT—S. Singh 22

WORKING CAPITAL AND CHOICE OF TECHNIQUES—V. Appavadhanulu 34

ECONOMIC HISTORY : AN INTRODUCTORY NOTE—N. Benjamin 42

RURAL LEADERSHIP AND RURAL CREDIT—A RELATION IN THE INDIAN ECONOMY—S. N. Bhattacharjee 47

ESTABLISHMENT AND DEVELOPMENT OF RURBAN CENTRES—M. S. Vishwanath 55

MEASUREMENT AND COMPARISON OF TECHNICAL CHANGE IN VARIOUS COUNTRIES—Juei Ming Cheng 59

DISGUISED UNEMPLOYMENT AND ECONOMIC GROWTH—A DIAGRAMATIC REPRESENTATION—Madappa Madaiah 74

INTERNATIONAL DISTRIBUTION OF INCOME 1961-1968—James H. Weaver and Nancy Wolf Myron 85

A NOTE ON DISTRIBUTION OF INDIRECT TAX BURDEN BY GRADES OF INCOME IN FARM AND NON-FARM SECTORS—S. L. Shetty 90

THEORY OF LEARNING AND THE CHOICE OF TECHNIQUES IN UNDER-DEVELOPED COUNTRIES—Prem S. Laumas 97

REVIEWS: 101

BRITAIN AND AMERICA 1850-1933, A STUDY OF ECONOMIC CHANGE, by Philip S. Bagwell and G. E. Mingay—Kanta Batra

EVENTS, IDEOLOGY AND ECONOMIC THEORY, (ed.) by Robert V. Eagly —S. C. Joseph

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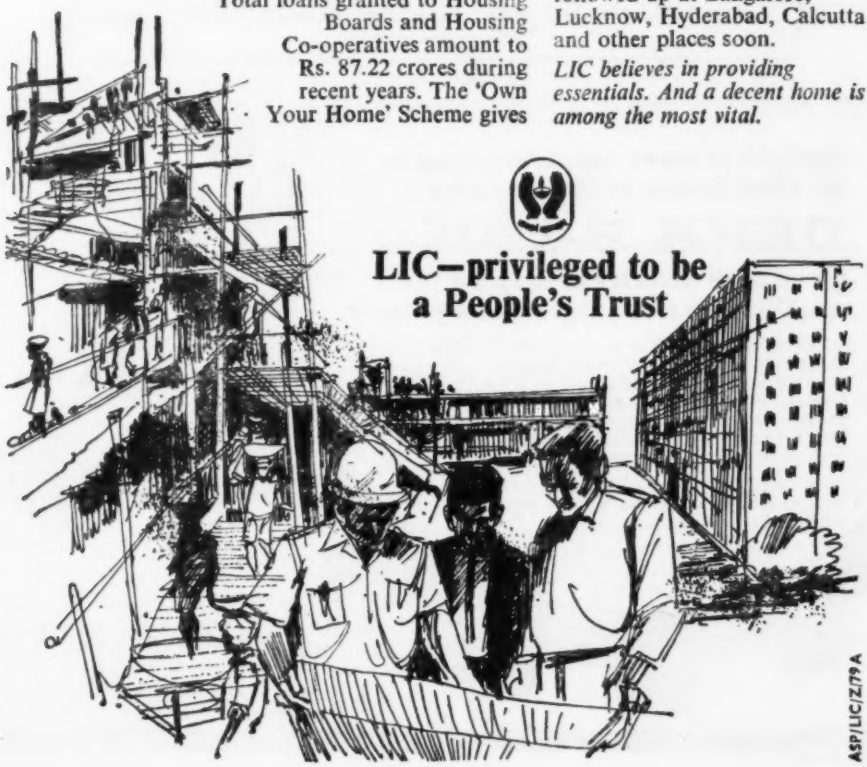

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'REGION' AS A DEVELOPMENTAL CONCEPT

AMIDST the post-War expansion in the field of studies is the "new discipline of regional planning"[1], which, as in many other cases, has been sponsored by the U.N.O. and its subsidiaries in a number of Conferences.[2] In the era of planning and international cooperation *vis-a-vis* developing countries, an attempt is being made to build up this field and formulate it purposefully and precisely.

This paper deals with a small but basic aspect of 'regional planning'—the definition of the concept, and a few of its planning implications in the context of *economic* development. The paper follows Indian planning where the major emphasis is economic, with the social and general welfare facets being, at least in the short run, secondary and regarded as a part of, though complementary to, economic growth.

1. *Different uses of the term 'region':*

In developing the 'new discipline' a bewildering variety of uses of the concept 'region' is found—from a tiny village in a small State as a nodal point of growth to a cluster of independent countries as a 'region'. Let us look at this variety of uses.

We are familiar with the United Nations' references to the ECAFE area as a region; for example, the *Nagoya* seminar[3] regarded the problem in "the ECAFE region as not identical with those of advanced countries"; and in his Foreward to the Regional Planning Proceedings of the 1958 seminar,[4] the U.N. Under-Secretary referred

[1] ECAFE **Seminar on Planning for Urban and Regional Development** (October 1966, Nagoya, Japan), p. 6. This document is referred to below as the **Nagoya Seminar.**

[2] e.g. U.N. **Seminar on Regional Planning,** (28th July-8th August, 1958, Tokyo, 1959, p. 220). Referred to below as the 1958 **Regional Planning Seminar.**

[3] **op. cit.**

[4] 1958 **Regional Planning Seminar,** op. cit., p. 1.

to "most countries of the Region" in the ECAFE area. This interpretation of the concept emphasises three characteristics of 'region', namely, (1) space or *area*, (2) *contiguity* and (3) *common* developmental *problems*. These, however, could very well be applied, along with others, to areas within a single country or within a part of a country itself.[5]

To illustrate from recent Indian usage: In a paper on field research methodology itself,[6] five projects with their 'regions' are thus described: In the *first*, the term refers to the "Western Region (old Bombay State)" comprising two *districts* in Maharashtra and two in Gujarat i.e. four districts in two different States; in the *second*, it refers to two *taluks* of one of the foregoing districts; in a *third* usage, the term envelops a *whole State*; "Gujarat including Saurashtra"; in a *fourth*, only *one district* is taken as a 'region'; and in the *fifth*, only *one taluk* i.e. a part of district, itself a part of a district, itself a part of State, is regarded as a 'region'. And some of these, for example, the fifth, are further stratified into four 'natural sub-regions'.

2. *Importance of development:*

Since regional planning has been associated with the developmental process, it is essential, before attempting to define the 'concept of region', to appreciate adequately the significance of development itself for our present purposes. Development not only has a continuity but also has two other facets, namely, the overall or all-sided growth, and the development of particular *aspects* such as economic and cultural. Development may be spatial, sectoral and/or temporal; i.e. it may relate to specific geographical areas as the north or the south, or to activities such as industry or agriculture, or to spread between the immediate present as in the Indian annual plans, and the near future as in the Five Year Plans, or over the long run as in perspective planning. It, no doubt, has to be a mixture of all the three since space, sectors and time are inseparable, but the greater emphasis on the one or the other gives development and 'region' their particular colour.

[5] It is, however, doubtful if these characteristics are found in the 'regions' of some research projects in India. Thus, in the Bombay Projects cited below (C. H. Shah, **Op. Cit**), the two districts of Gujarat are **not** contiguous with the two in Maharashtra, and even the two Gujarat districts are separated by an intervening district.

[6] C. H. Shah: 'Some Methodological Problems in Field Research in Agricultural Economics', (pp. 63-67 in A. K. Das-Gupta (ed.) **Methodology of Economic Research**, Asia, 1968).

The current stress in regional planning discussions is largely on particular facets, especially the spatial and sectoral ones, although the particulars are intended to contribute to overall growth ; and this is specially true of underdeveloped countries as in the ECAFE area and of India. This piecemeal approach is explained by the multiplicity of problems requiring solution, the scarcity of resources and the need for a quick and effective start in the race for rapid growth.

3. *The Concept of Balance :*

Another fundamental needing clarification in any attempt to define a 'region' relates to the controversial but freely discussed developmental objective, namely, the concept of 'balanced development'. What should be the developmental goal in the near future ? Should it be 'balanced development' ?—Whatever the term 'balance' may connote—. Or, should it be 'optimum' growth or output maximisation, given the problem and resources ? Currently, the emphasis in planning in any *single* country is on balanced growh, *via* balanced dispersal of investment territorially and/or sectorally. This has resulted in a limited and conflicting definition of what a 'region' means for purposes of resources-allocation ; and this point is elaborated below.

But, unless a different emphasis on 'balance' is placed and the need for 'balanced development' is interpreted so as to reconcile it with the concept both of 'optimum growth' and of 'output maximisation', planning 'regionally' might lead, as in the location of the fifth steel plant in India, to waste of resources.

The current search for 'balanced development' has had its reactions on the concepts of 'region' and of 'regional planning'. In all communities, including the most advanced such as U.S.A. and U.K., territorial and sectoral imbalances in the stage, rate and pattern of growth, per capita income, employment opportunities, etc are found, being particularly marked in developing countries. Consequently, two or three, broad 'regional' claims have been, or *can be* made on resources, and so for development, based on (1) the physical or administrative areas, (2) outlay openings, and (3) the temporal or time period i.e. the 'region' of the present or the near future *versus* that of the long run returns and well-being.

The claims based on outlay openings leads to conflicts in the allocation between economic growth, as indicated by the measurable investment-returns criterion and non-economic demands such as social, administrative and cultural, their benefits, though highly desirable, being vague and not measurable. The area approach affects

spatial priorities of resource allocation and since these areas are not uniform in needs and growth potential, regional claims for more schools and hospitals, better administration, and so on, would compete with the quantitative economic facet in the application of balanced, optimum or maximum development tests.

The conflict between the economic and non-economic purposes would present two alternative criteria in choosing a 'region' for planning purposes: (1) the investment-returns test—tangible, self-generating, basic to material life and measurable of input, efficiency and economic benefit. If this test is accepted, a region for developmental purposes would be different from that under the second critrion, namely, (2) the expenditure-welfare test, which,—though it is the end-objective—, is vague, non-measurable, not equally self-generating and, therefore, wasteful of resources at least in the relatively short run, say, of less than a generation. The impact of these two on the choice of regions for planning investment may be illustrated from India to-day:—Should resources be diverted more to expanding steel plants in Bihar, minor irrigation works in Bombay or tribal welfare in Chota Nagpur ?

The second facet of the concept of balance shows itself more directly in the conflicting claims at three levels:

(1) The whole *country* as a region *versus* the component *States* as claimants for development. This is particularly true in federal structures. In India itself there are claims and rivalries between different States as 'regions' for, say, the location of the fertilizer units, leading to uneconomic use of resources, delays. difficulties in coordinating investment and effort, and in executing projects, and also to varying political pressures.

(2) A second facet of conflicting claims is between parts of a single State for 'regional' investment purposes, for example. *maidan* versus *malnad* in the Mysore State. These claims are area-oriented and arise because of differences in the stages of growth, in resources and facilities, and in the problems themselves. Even in developed countries such as U.S.S.R. and U.S.A. this facet of regional claims is common.

(3) There is also a problem-oriented facet of this regional concept, for example the urban *versus* rural conflicts, the problem of metropolitan growth *versus* "regional development" discussed elaborately at the United Nations seminars.[7] Regional development was here

[7] e.g., **The Nagoya Seminar, op. cit.,** and the **1958 Regional Planning Seminar, op. cit.** A number of papers were presented at these conferences.

equated with an area broader than, possibly exclusive of, a metropolis, and identified especially with the rural area. One U.N. seminar suggested[8] three types of regions each with its particular problems: (1) 'metropolitan' with, for instance, its problems of urbanisation and industrialisation; (2) '*resources development regions*' with their problems such as hydro-electric watersheds; and (3) *rural regions* with their problems such as village improvement. Although the meropolis was mentioned as one type of region, emphasis in this seminar appeared to have been on the region as a broader, if not an altogether different, area. For, it quotes with approval an earlier U.N. document[9]:— 'The regional approach, resulting in the regional plan, can check the current powerful trend towards overgrowth and overcrowded cities and provide for a more balanced economic and social life within the region as a whole'. The emphasis on this urban-rural distinction for explaining a region and associating regional planning with the latter is suggestive of a different conception of region in the planning process. This may be traced to the too rapid growth of cities and consequent repercussions on resource-utilisation; but the distinction, even if tenable, would not facilitate clearer demarcation of the rural and urban areas for developmental purposes, nor help output maximisation.

There are also other interpretations of 'balance' and, therefore, of 'regions' e.g. distinguishing between industrial and agricultural 'regions' and refering to their conflicting claims on resources. Yet another association of region latterly becoming prominent[10] is based on the distinction between physical and economic planning.

4. *Tentative definition:*

I shall tentatively[11] define a 'region' as "operationally the most convenient and economically the most gainful spatial, sectoral and/or temporal unit for resource-allocation, taking planning as merely a process, growth as the economic result and welfare as the ultimate goal". And in the light of this interpretation, I shall further define 'balanced development' as the "balance of *returns* from overall national investment—public *and* private—in relation to short and long

[8] 1958 **Regional Planning Seminar**, p. 4.

[9] U.N., **Seminar on Housing and Community Improvement in Asia and the Far East, 1954**, p. 100.

[10] e.g., The Nagoya Seminar's objective itself (**op. cit.**, p. 5), was to examine the distinction and elaborate.

[11] A mroe refined definition and elaboration of some of the basic ideas in this paper will be made in a fuller paper.

term goals and not necessarily with reference to any particular areas, activities, States, and so on ". That is, the test is the most beneficial utilisation of resources—physical, human and financial—without being bogged down to areas and sectors or occupations. This view relates 'balance' and therefore, 'region', to a number of inter-relationships: (1) needs—resources—returns ; (2) geographical areas in themselves ; (3) parts of country *vis-a-vis* other parts ; (4) intersectoral or occupational, i.e., as between different outlay openings ; (5) temporal—the short, long and secular period needs and returns ; (6) objectives, e..g. employment *vs.* output.

New Delhi and Mysore M. H. GOPAL

THE CONCEPT OF EXTERNAL ECONOMIES IN ECONOMIC DEVELOPMENT*

I

THE concept of "External Economies" for a long time had no significant impact on the field of economic theory, the early promise of its role in Alfred Marshall's principles remained unfulfilled. The principal recognition was given to the concept by the critics who did not hesitate to attack the concept in general, under the dubious caption of "Of Empty Economic Boxes". But with the publication of Allyn Young's famous article "Increasing Returns and Economic Progress" in 1928, a new connotation of the concept of external economies emerged which has become significant and meaningful in the field of economic analysis. Furthermore, as economic development again became an important issue, economists were compelled to reinterpret this concept in the context of economic growth and it has become a creative concept on different fronts. The reinterpretation of the concept in this light is definitely an illuminating contribution to our understanding of economic progress.

Marshall, in introducing the concept, defined "External Economies" as "those dependent on the general development of the Industry",[1] or in Jacob Viner's more precise phrase, "those which accrue to particular concerns as the result of the expansion of output by the industry as a whole, and which are independent of their own-individual outputs".[2]

On the whole, Marshall's apparent interest in the concept of external economies seems to be two-fold. First, together with internal economies, they deserve study as a chief source of economic progress; secondly, and more specifically, the concept provided a partial answer to the problem posed for partial equilibrium analysis by the phenomenon of increasing returns. However, the distinction between internal and external economies does not overcome all "the difficulties which confront the theory of equilibrium with regard to commodities which obey the law of increasing

* The author is indebted for helpful criticisms of earlier drafts to Professor K. H. Parsons and Don Kanel of the University of Wisconsin, Madison.

[1] Marshall, **Principles of Economics,** 8th ed., p. 266, Macmillan, (1920).

[2] J. Viner, "Cost Curves and Supply Curves", **Readings in Price Theory,** p. 217.

returns",[3] especially, the indeterminacy of the long period supply price of a product or commodity. But "External Economies" were at least concerned with the implication of the "Internal Economies" in that "... the firm which first gets a good start will obtain a monopoly of the whole business of its trade in its district".[4] It is a fact that the benefits of increasing returns largely accrue as external economies, as much as the limits set to the growth of individual firms by loss of entrepreneurial "elasticity and progressive forces",[5] which makes it possible to reconcile "increasing returns and competitive equilibrium".[6]

Throughout the *Principles* there are broad references to external economies as a source of economic progress. But it is to be noted that whenever Marshall distinguished carefully between internal and external economies, the context was of partial equilibrium analysis of the competitive model. The narrow and limiting assumptions and objectives of this approach account for the relatively narrow definition and scope of what is now referred to as 'strictly Marshallian' external economies.[7] All that was known in this context, was that such economies accrued to the individual firm independently of the size of its own output, and that they had the effect of reducing the costs of production of the "representative" firm, turning out an output from a plant of optimum scale for that level of output. Furthermore, the model of competitive equilibrium as suggested by Joan Robinson necessarily requires the assumption of a given demand curve for a given product of an industry;[8] and as a result of this circumstance, changes in factor earnings would affect the demand curves, furthering the assumption of perfectly elastic supply of factors of production.[9] Marshall recognized, of course, that, cost reduction through external economies implied an increase in the "efficiency of capital,"[10] and would, respectively, stimulate and jack up investment; but strictly speaking this was not the point which interested Marshall in this connection.

[3] A. Marshall, **op. cit.**, p. 805.

[4] A. Marshall, **op. cit.**, p. 459.

[5] A. Marshall, **op. cit.**, p. 316.

[6] Allyn Young, "Increasing Returns and Economic Progress", **Economic Journal**, Dec. 1928, p. 527.

[7] P. N. Rosenstein-Rodan, "Problems of Industrialization of Eastern and South Eastern Europe", **E.J.**, June-Sept., 1943, p. 206.

[8] Joan Robinson, **The Economics of Imperfect Competition**, (MacMillan. 1934), p. 341 (Appendix).

[9] **Ibid.**, p. 361.

[10] A. Marshall, p. 318.

In the main, Marshall's examples follow this pattern. The external economies which accrue to a firm from the growth of the industry are "chiefly matters of improved organization";[11] "improved methods or machinery which are accessible to the whole industry";[12] "advances made by subsidiary industries";[13] "development of mechanical appliances, of division of labour and of the means of transport and improved organization of all kinds";[14] and particularly those which result from the growth of correlated branches of industry which mutually assist one another, "may be being concentrated in the same localities",[15] such as the development of 'hereditary skill', the growth of "subsidiary trades...supplying it with implements and materials", and "the economic use of expensive machinery";[16] also "those connected with the growth of knowledge and the progress of arts";[17] for example, in "matters of trade knowledge: newspapers, trade and technical publciations".[18]

As a result of all this, economists who deal with external economies in the same context, naturally retain the same limited assumptions and narrow definition.[19] As such, Mrs. Robinson, who analyzed thoroughly the nature of increasing returns in the context of partial equilibrium analysis, has made explicit the assumption which had largely been implicit in Marshall's discussion, and defined the concept of external economies in strictly Marshallian terms. That is, "when a new firm enters the industry it may enable all the firms to produce more cheaply so that, while each produces at its minimum average cost, the cost of the minimum is reduced".[20] The main illustrations she had in mind were the case "where the machinery can be bought more cheaply when the industry presents a large market to the machine-making industry" and where "a large labour force is accustomed to work at a certain trade" and develops "traditional skill".[21]

[11] A. Marshall, p. 318.
[12] A. Marshall, p. 615.
[13] A. Marshall, p. 615.
[14] A. Marshall, p. 808.
[15] A. Marshall, p. 317.
[16] A. Marshall, p. 217.
[17] A. Marshall, p. 266.
[18] A. Marshall, p. 284.
[19] Article by Clapham and Robertson on the "Empty Boxes", reprinted in **Readings in Price Theory,** Chapters 5 and 7.
[20] Joan Robinson, **The Economies of Imperfect Competition,** p. 340.
[21] **Ibid.,** p. 341.

II

Allyn Young's Thesis :

Allyn Young, in a famous article, " Increasing Returns and Economic Progress " published in 1928, defined the concept of external economies in a very broad manner. He started out from Adam Smith's renowned dictum that ' the divisoin of labour is limited by the extent of the market '. But at the same time, he pointed out " in an inclusive way that, as the market is not an outlet for the products of a particular industry, and therefore, external to that industry, but is the outlet for the goods in general, the size of the market is determined by the volume of production ".[22] Further looking not at one industry but at the economy as a whole, suppyl creates its own demand, any increase in aggregate output anywhere widens the market for goods in general, provided there is " some sort of balance, that different productive activities (are) proportioned one to another ",[23] thus creating new opportunities for further increase in output by further division of labour and in other ways. Or in other words, every increase in aggregate output, by widening the market, yields " external economies " to firms somewhere in the economy.

This type of external economies, to which Allyn Young was inclined to attribute " the leading role in that continuing economic revolution of the last two or three centuries ",[24] are of the nature which may not find any place in Marshallian partial equilibrium analysis. For Marshall in his interpretation of external economies confined his attention to one industry and assuming a given demand curve (for a given product) inevitably precluded those external economies which resulted from shifts in the demand curves. But since Marshall did not always interpret external economies in the narrow sense of economies due to growth of a single industry, and since his first reference to external economies was those which depend chiefly on the aggregate volume of production, if we were to treat the concept of external economies from this broad point of view it will be possible to widen the scope of the concept to include " all cost reductions accruing to firms (or industry) from expansion of output of goods and services in general ".[25]

[22] Allyn Young, " Increasing Returns and Economic Progress ", p. 533, E.J., Dec., 1929.

[23] **Ibid.**, p. 533.

[24] **Ibid.**, p. 536.

[25] **Ibid.**, p. 266.

On the other hand, Allyn Young went a step further in his treatment of the concept of external economies by regarding it as a source, perhaps the most important source, of economic progress. No doubt his reinterpretation of external economies is definitely an illuminating contribution to our understanding of economic progress as a cumulative process which feeds on itself. But this fact should not bind us to the limitation of Allyn Young's approach.

First of all, Allyn Young, on an off, pointed out in his thesis that the process by which an expansion of market makes it economical to carry it further, the division of labour and particularly the adoption of "capitalistic or round about methods of production",[26] is not necessarily the only mechanism in its wider sense which yields external economies, and makes for cumulative economic growth. Also there are references of other kinds such as "changes of qualitative nature, new products appear, firms assume new tasks, new industries come into being".[27] But other possible mechanisms are not analyzed (by Allyn Young) in a detailed manner, but instead, are referred to only in an obscure and vague manner such as, "every important advance in the organization of industry, regardless of whether it is based upon anything which, in a narrow or technical sense, could be called a new 'invention' or involves a fresh application of the fruits of scientific progress to industry, alters the conditions of industrial activity and initiates responses elsewhere in the industrial structure which in turn have a further unsettling effect".[28]

Furthermore, according to Allyn Young, the only possible way of realizing external economies is through an expansion of markets, resulting in an increase in output or a rise in productivity, that is, in the efficiency with which existing resources are employed. But in this connection, the possibility that the initial increase in output might result from the employment of hitherto unused resources does not enter his argument, for he accepts Say's law of market without the qualifications which were later added.

Thus, the whole thesis of Allyn Young centers on the effect of an increase in the market in reducing costs, thus increasing productivity and output, and thence widening the market further. At this point, and no doubt like Marshall, he is well aware of the fact that cost reduction stimulates further investment. He lays special stress on this

[26] **Ibid., p. 539.**
[27] **Ibid., p. 528.**
[28] **Ibid., p. 533.**

fact, but at the same time, since he is concerned with the product effect, rather than with the process effect of investment, the stimulus given to investment is not of much concern to him.

III

The Concept of 'External Economies' in Different Context:

Generally speaking, the concept of external economies emphasized in recent discussions of the problems of economic development of underdeveloped countries, corresponds to Allyn Young's definition. But there seems to be a change in the context, emphasis, and usage of the concept, which has in turn given the concept a new meaning.

Professor Rosenstein-Rodan was the first economist to introduce this concept into the discussion of economic development. In his well known article of 1943, he has tried to explain the context in which the concept of external economies has been employed in relation to economic development; "existing institutions of international investment are inappropriate to the task of industrialization of a whole area. They deal with two small units, and do not take advantage of external economies", and it is "not profitable for a private enterprise to invest in training labour but, it is a good investment for the bulk of industries to be created when taken as a whole ... it constitutes an important instance of the Pigovian divergence between private and social marginal net product".[29]

Thus the emphasis under this new context seems to be one of "external economies", not so much in reducing costs, as in stimulating investment; and the significance of external (as contrasted with internal) economies is that they cause divergencies between private and social marginal product. These interpretations are thus advanced as a major explanation of the paradox that private investment does not seem to be attracted by the investment opportunities offered by capital-poor underdeveloped countries, where the marginal productivity of capital might be expected to be high. "The technical opportunities may be great: the physical increase in output may be spectacular compared with existing output, but value productivity is limited by the low purchasing power of the people ... The notion of 'external economies' seems applicable here though not quite in the sense in which Marshall commonly used it".[30]

[29] Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe", **E.J.**, June-Sept., 1943, p. 204.

[30] Ragnar Nurkse, **Problems of Capital Formation in Underdeveloped Countries**, (Blackwell, 1953), p. 14.

Even though the concept of "external economies" should mean the same as Allyn Young's, a new interpretation has really crept in. The difference is not that Allyn Young used the concept to explain the actual process of cumulative progress in the advanced and still growing economies, while now it is used to account for the failure of this cumulative process to get under way in the relatively stagnant underdeveloped areas.[31] The more important change lies in the new emphasis on the significance of external economies for the inducement to invest. In place of increasing returns, in the sense of falling costs with increasing output, we are now concerned with mutual support between acts of investment in different fields : that is "in all cases where investment stimulates rather than discourages further investment",[32] and the external economies instead of covering these cases of increasing returns which occur independently of the output of individual firms (or industries) now cover those cases where the favourable repercussions of investment do not fully accrue to the investor in a given field.

The main examples of external economies in this sense are the same as those of Allyn Young's type ; that is, "each of a wide range of projects, by contributing to an enlargement of the total size of the market, can be said to create economies external to the individual firms or industries".[33] Furthermore, "most industries catering to mass consumption are complementary in the sense that they provide market for and thus support each other".[34]

But generally these are not all the cases where investment creates new investment opportunities elsewhere. "It might easily happen that any one enterprise would not be profitable ... But the creation of such enterprise, such as production of electric power, may create new investment opportunities and profits elsewhere ; for example, in the electrical equipment industry".[35] Again, usually "external economies are invoked as an argument in favour of a different program of industrialization ... investment should concentrate at the start on 'basic industries' ; the normal multiplier effect will naturally lead to further industrialization according to the advocates of this program".[36] The

[31] H. W. Singer, "Economic Progress in Underdeveloped Countries", **Social Research,** 1949, p. 9.

[32] L. M. Lachmann, "Investment Repercussions", **Q.J.E.,** November, 1948.

[33] R. Nurkse, **op cit.,** p. 14.

[34] **Ibid.,** p. 11.

[35] Robenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe", **E.J.,** June-Sept., 1943, p. 207.

[36] Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe", **E.J.,** June-Sept., 1943, p. 208.

presence of external economies can be best illustrated if we were to consider investment in an irrigation project: "Irrigation brings closer settlement. Denser settlement may make worthwhile the construction of a railway. This reduces transport costs and enables production to be further expanded. Processing industries may be attracted by the increased production, thus increasing the regional population and creating a local market for food and the services of tertiary industries, etc."[37] One more example is attributed by Rosenstin-Rodan to Allyn Young—"the construction of a suburban tube line which yields external economies in the form fo capital appreciation of adjacent land and buildings".[38] Thus it is clear that the term "external economies" has been transferred from the economies to which investment in a new industry or capital equipment may give rise to the new industry or capital equipment itself: "The most productive form of development is the systematic creation of those indispensable external economies in production, especially in the field of transport and power".[39]

IV

"Economies"—An Explanation—of it being 'External' under conditions of Increasing Returns:

Analytically speaking, the one important thing to be explained in relation to external economies, is why increasing returns in many cases accrue as external, rather than internal economies; or, in other words, why, in the Marshallian case, an increase in the output of an industry, say through the establishment of new firms, may reduce costs to other firms in the industry, as well as to new firms themselves?

If we regard all the advantages resulting from an initial rise in output, including both the profits directly accruing to the entrepreneur and the benefit accruing indirectly to other firms as the total yield of the investment, the answer then seems to be that external economies are due to the fact that the investor is, for one reason or another, failing to reap for himself whole of the yields of investment. The next question which becomes evident at this point is one of determining the factors which stand in the way of the investor

[37] G. O. Gutman, "Investment in Development Progress", paper read at Canberra meeting of the Australian and New Zealand Association for the Advancement of Science, January, 1954, p. 10.

[38] Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe, E.J., June-Sept., 1943, p. 207.

[39] Singer, "Economic Progress in U.D. Countries", **Social Research**, 1949, p. 6.

from reaping the total yields of his initial investment. To all these questions an answer can be found within the Marshallian analysis. For since there is an assumption of perfect competition implicit in Marshallian analysis, a producer of any product cannot appropriate all the benefits of his investment as long as the competitive forces require him to pass the gain on to his customers in the form of competitive prices; without discrimination, the old firm must benefit equally with the marginal new firm.

But in cases of public regulation, competition may not be a force at all in preventing the appropriation of the entire yield of an investment. For example, in the case of an increase in farm output yielding external economies by spreading the overheads of an existing railway system over a larger volume of transport services, it is more likely to be public regulation than competition which will insure that external economies accrue to the farmers rather than to the railway company.

But in contrast to this type of analysis, an altogether different explanation emerges in Allyn Young's treatment of the concept of external economies, which accrue when an increase in output anywhere in the economy widens the market for goods and services in general and thus creates new investment opportunities elsewhere.

Furthermore, the reason why the benefits of an increasing return from an enlargement of the market do not usually accrue to a significant extent to the initial investor responsible for the increase in productivity and real income which caused the enlargement of the market, is fundamentally, as Ragnar Nurkse puts "the diversity of human wants",[40] The recipients of an increase in real income will spend the additional income on a large variety of goods and services; that is why Say's law is never valid in the case of individual industry yet holds good for the economy as a whole. Moreover, through the income elasticities of demand for differentt products, it is possible to justify the distribution of the benefits in the form of external economies, as Allyn Young mentions "the rate at which one industry grows is conditioned by the rate at which other industries grow, but since the elasticity of demand and supply will differ for different products, some industries will grow faster than others".[41]

On the whole, in recent years economists writing on the problem of under-developed areas generally use the concept of external economies in two different senses; one is the exploitation of Allyn Young's

[40] R. Nurkse, **op. cit.**, p. 4.
[41] Allyn Young, p. 534.

type of external economies in the form of "balanced growth" via a wave of capital investments in a number of different industries",[42] and "complementarity of different industries provides the most important set of arguments in favour of a large scale planned industrialization".[43] The other is the government initiative in the provision of basic services (such as transport, power, irrigation, etc., and even in undertaking entrepreneurial acitvities) and social overhead capital, education, public health, etc.; the benefits of which accrue largely as external economies and which therefore do not sufficiently attract private investors. In all these cases, public investment has one great advantage over private, in that what are "external economies" for society as a whole.[44] However, this is not an argument in favour of government intervention or participation for it is highly possible that government operation any involve 'dis-economies' of its own.

The University of Wisconsin—Green Bay Ismail Shariff

[42] R. Nurkse, **op. cit.**, p. 13.

[43] Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe, **E.J.**, June-Sept., 1943 p. 205.

[44] Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe, **E.J.**, June-Sept., 1943, p. 207.

PRODUCTION FUNCTIONS AND THE ELASTICITY OF AVERAGE PRODUCTIVITY*

THE elasticity of a curve at any given point (or over any given range) is independent of curvature while the direction of the rate of change of the elasticity is not. This paper seeks to prove that the elasticity of average physical productivity with respect to the variable input (labour) (i) necessarily rises when the curve is either linear or concave from below; and that, when the curve is convex from below, it (ii-a) rises, (ii-b) remains constant, or (ii-c) falls according as the proportionate rate of change of the marginal physical productivity is (ii-a) greater than, (ii-b) equal to, or (ii-c) less than that of the average. The Cobb-Douglas type of function is characterized by (ii-b) and the average physical productivity curve is not only convex from below but also is a rectangular hyperbola. All these results are for a single-output single-input production function (with a single variable input).

In the light of this, it is seen that, whatever its practical usefulness, the Cobb-Douglas type of function is a very restricted one—indeed, more restricted than one which yields a rising elasticity of average productivity. Such being the case, the 'fitness' of the Cobb-Douglas type must in every case be tested by the criterion of the behaviour of the rate of change of the elasticity deduced from the data, since this is a crucial test of fitness. Some vital propositions in the Ricardian theory of factor-shares hang on this criterion; and one's results are certain to be marred seriously if the empirical work of fitting a production function to the data were to proceed on the unverified assumption that the elasticity of average physical productivity is constant.

An immediate application of this is to Ricardo's law of rents that rents rise as a proportion of the total agricultural product ("the whole produce" of the earth, as he calls it) in a "growing" economy (under capital accumulation) where production is subject to diminishing returns. The theorem is derived in respect of the average physical productivity function with the above application in view; but it is of more general interest and applies to the elasticity of *any* function besides a production function.

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II

Let $T \equiv \varphi(x)$ be any general production, where x is the variable input (say, labor) and T is the total physical product.

Then, $A \equiv \frac{\varphi(x)}{x}$ and $M \equiv \varphi'(x)$ where A and M are the average and marginal physical productivity functions respectively ... (1)

Define $\varepsilon_a \equiv \frac{-d(\log A)}{d(\log x)}$ ...(2)

and $\varepsilon_m \equiv \frac{-d(\log M)}{d(\log x)}$ ...(3)

as the elasticities of the average and marginal physical productivities respectively.

From the definition of A, we have

$$\frac{dA}{dx} = \frac{d}{dx}\left\{\frac{\varphi(x)}{x}\right\}; \text{ or}$$

$$\frac{dA}{dx} = \frac{\varphi(x)}{x^2}\left\{\frac{x\varphi'(x)}{\varphi(x)} - 1\right\}. \quad ...(4)$$

By substituting (4) in the expression for ε_a in (2), we obtain

$$\varepsilon_a = \frac{-x}{A}\frac{dA}{dx} = 1 - \frac{x\varphi'(x)}{\varphi(x)} \quad ...(5)$$

If we prefer it, we can write $\varepsilon_a = 1 - \frac{M}{A}$. Incidentally, we can see that the elasticity of the total physical productivity, ε_t, is equal to $1 - \varepsilon_a$, or the ratio of the marginal to the average productivity; so that $\frac{d\varepsilon_a}{dx} = \frac{-d\varepsilon_t}{dx}$.

From (5), we obtain

$$\frac{d\varepsilon_a}{dx} = -\frac{d}{dx}\left(\frac{x}{A}\frac{dA}{dx}\right)$$

$$= -\frac{x}{A}\frac{d^2A}{dx^2} - \frac{dA}{dx}\left(\frac{A - x\,dA/dx}{A^2}\right); \text{ or}$$

$$\frac{d\varepsilon_a}{dx} = -\frac{x}{A}\frac{d^2A}{dx^2} - \frac{1}{A}\frac{dA}{dx} + \frac{x}{A^2}\left(\frac{dA}{dx}\right)^2. \quad ...(6)$$

Hence, when the A-curve is either concave from below, or linear we have $\frac{d^2A}{dx^2} \leqslant 0$ and, so *necessarily* $\frac{d\varepsilon_a}{dx} > 0$.

It now remains to investigate the other case when the A-curve is convex from below and $\frac{d^2A}{dx^2} > 0$.

Now, $\frac{d^2A}{dx^2} = \frac{d}{dx}\left(\frac{dA}{dx}\right)$.

Making use of (4), which is $\frac{dA}{dx} = \frac{\varphi'(x)}{x} - \frac{\varphi(x)}{x^2}$, we obtain $\frac{d^2A}{dx^2} = \frac{\varphi''(x)}{x} - \frac{2\varphi'(x)}{x^2} + \frac{2\varphi(x)}{x^3}$ which can be rewritten as

$$\frac{d^2A}{dx^2} = \frac{\varphi'(x)}{x^2}\left\{\frac{x\varphi''(x)}{\varphi'(x)} - 1\right\} + \frac{\varphi(x)}{x^3}\left\{2 - \frac{x\varphi'(x)}{\varphi(x)}\right\} \text{ or as}$$

$$\frac{d^2A}{dx^2} = \frac{\varphi(x)}{x^3}\left[\frac{x\varphi'(x)}{\varphi(x)}\left\{\frac{x\varphi''(x)}{\varphi'(x)} - 1\right\} + 2 - \frac{x\varphi'(x)}{\varphi(x)}\right]. \quad (7)$$

Making use of the definitions of ε_a and ε_m above, we get

$$\frac{d^2A}{dx^2} = \frac{\varphi(x)}{x^3}\left\{(\varepsilon_a - 1)(\varepsilon_m + 1) + (\varepsilon_a + 1)\right\}.$$

$$\therefore \frac{x}{A}\frac{d^2A}{dx^2} = \frac{1}{x}\left\{(\varepsilon_a - 1)(\varepsilon_m + 1) + (\varepsilon_a + 1)\right\} \because \frac{x}{A} = \frac{x^2}{\varphi(x)}. \quad ...(8)$$

Substituting (8) in (6) and making use of the definitions of ε_a and ε_m.

$$\frac{d\varepsilon_a}{dx} = \frac{\varepsilon_a}{x}(\varepsilon_a + 1) - \frac{1}{x}\left\{(\varepsilon_a - 1)(\varepsilon_m + 1) + (\varepsilon_a + 1)\right\}$$

$$= \frac{(\varepsilon_a - 1)}{x}\left\{(\varepsilon_a + 1) - (\varepsilon_m + 1)\right\}; \text{ or}$$

$$\frac{d\varepsilon_a}{dx} = \frac{(\varepsilon_a - 1)}{x}(\varepsilon_a - \varepsilon_m). \quad ...(9)$$

From $0 < \varepsilon_a < 1$ (rational factor-hire), and $x > 0$, we therefore have

$$\frac{d\varepsilon_a}{dx} \gtrless 0 \text{ acc. as } \varepsilon_m \gtrless \varepsilon_a. \quad ..(10)$$

Alternatively,

$$\frac{d\varepsilon_a}{dx} \gtrless 0 \text{ acc. as } \frac{-d}{dx}(\log M) \gtrless \frac{-d}{dx}(\log A) \quad ..(11)$$

In words, the numerical value of the elasticity of average physical productivity curve (i) necessarily rises with respect to the variable input if the curve is either linear or concave from below, and (ii) rises, remains constant, or falls when the curve is convex from below, according as the proportionate rate of change of marginal productivity is greater than, equal to or less than that of the average pro-

ductivity. These propositions can readily be expressed in terms of the elasticity of the total physical productivity curve, since

$$\frac{d\varepsilon_a}{dx} = \frac{-d\varepsilon_t}{dx} .$$

III

The above results are conveniently translated into geometrical terms. Represent labour along the horizontal axis and productivity (average and marginal) along the vertical. Let $T_a t_a$ and $T_m t_m$ be the tangents to the A and M curves respectively at points on them corresponding to x=OB.

$$\varepsilon_a = \frac{-x}{A}\frac{dA}{dx} = \frac{OB}{BD} \cdot \frac{BD}{Bt_a}$$

$$\therefore \quad \varepsilon_a = \frac{OB}{Bt_a} .$$

Similarly,

$$\varepsilon_m = \frac{OB}{Bt_m} . \qquad \ldots (12)$$

$$\therefore \quad \frac{\varepsilon_m}{\varepsilon_a} = \frac{Bt_a}{Bt_m} .$$

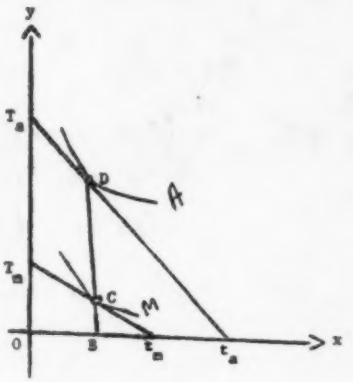

Figure 1

Hence, $\varepsilon_m \gtrless \varepsilon_a$ acc. as t_m lies to the left of t_a, coincides with it or lies to its right. (For falling M and A, both t_m and t^a lie necessarily to the right of B).

In words, the elasticity of the average physical producitivity rises, remains constant, or falls according as the X-intercept of the tangent to the marginal productivity curve is less than, equal to, or greater than that of the tangent to the average productivity curve.

Now, when both the curves are linear, $Ot_m = t_m t_a$; when they are both concave from below, $Ot_m < t_m t_a$; and when they are both convex from below we have all the possibilities, $Ot_m \gtrless t_m t_a$ Hence, when both the curves are linear or concave from below, t_m necessarily lies to the left of t_a; and it is only when they are both

convex from below that we have ambiguity in this respect. However, in the convexity case, over a range towards the horizontal axis, t_m must necessarily lie to the left of t_a (on the 'normal' assumption that M cuts the horizontal axis while A is asymptotic to that axis); and, again, there is a range towards the vertical axis over which too t_m must necessarily lie to the left of t ; so that the indeterminacy is in the intermediate range. The question of whether that range of indeterminacy exists at all and, if so, what its extent is, turn upon the special properties of each given empirical production function and cannot be answered *a priori*. The law of 'diminishing returns' itself is only necessary and not sufficient for $\frac{d\varepsilon_a}{dx} > 0$ in the convexity case, while linearity and concavity necessarily imply the sufficient condition.

VI

To apply the above analysis to the Ricardian model of distribution, denote rents by R, and the rent-share in the total product by $\overline{R}$

$$R \equiv \varphi(x) - x\varphi'(x). \qquad \ldots(13)$$

Differentiation of (13) w.r.t. x yields

$$\frac{dR}{dx} = -x\varphi''(x) \text{ which is positive from } \varphi''(x) < 0. \qquad \ldots(14)$$

Hence, given diminishing returns, the absolute amount of rents rises (with accumulation) in the Ricardian system.

$$\overline{R} \equiv \frac{\varphi(x) - x\varphi'(x)}{\varphi(x)} = 1 - \frac{x\varphi'(x)}{\varphi(x)}, \qquad \ldots(15)$$

Differentiation of (15) w.r.t. x gives

$$\frac{d\overline{R}}{dx} = \frac{d}{dx}\left\{1 - \frac{x\varphi'(x)}{\varphi(x)}\right\}; \text{ or, from (5), } \frac{d\overline{R}}{dx} = \frac{d\varepsilon_a}{dx}. \qquad \ldots(16)$$

$$\text{Hence, } \frac{d\overline{R}}{dx} \gtrless 0 \text{ acc. as } \frac{d\varepsilon_a}{dx} \gtrless 0. \qquad \ldots(17)$$

The above analysis at once applies to this problem of rent-share in Ricardo's macro-model.[1]

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[1] For a full version of the Ricardian theory, see "The Ricardian Theory of Factor-Shares", a paper of mine to be published in **Explorations in Economic History** (The University of Wisconsin), Summer, 1971.

THE CONCEPT OF ECONOMIC DEVELOPMENT AND ALL THAT

I

THE relative shift in interest of economists, from their preoccupation with purely static marginal analysis or purely short-run problems of cyclical unemployment and protracted dangers of secular stagnation, to the problems relating to economic development particularly in the context of underdeveloped countries is only a post World War II development, and, a large pile of literature on the subject has already accumulated since then. The literature, however, is conspicuous by lack of explicit meaning of some of the basic terms it employs and it is largely policy oriented in character. Hence it is not far from easy to find a wide range of different and often conflicting concepts covered by a single verbal label or a single concept expressed through different verbal nomenclatures, with the consequence that our conception of it has remained a vague one. Very few of us either know or even try to know what exactly the word refers to. Their connotation is not very clear and their denotation not well defined.

1.2. We should, it goes without saying, have a clear and definite conception of the basic terms we employ. What, for instance, is a Country, an area, a region and an economy ? Should they be used interchangably ? Do the terms backward, poor, preindustrial, undeveloped, underdeveloped, less developed and developing convey one and the same meaning ? What is meant by economic development of a Country as a process of change ? Is it a correct tendency to use the terms secular change, advancement betterment progress growth and development as interchangeables ? Which countries can be called economically developed and which underdeveloped ?

1.3. We do not mean even the least in this note to challenge the semantic sovereignty of economists who are at a liberty to spread anarchism by coining and using any term they like. But we must be, at least, aware of dangers involved in such adventures. Some would, of course, like to avoid worrying about it lest they might appear as being interested in definitions which in their view should be tabooed in economics. Others would like to say that these various distinctions are too academic and of no operational significance. But what a state of utter confusion and chaos this branch of economics would be facing if various economists coin different names for

the same phenomenon or attach different meanings to the same term. There should not be any scope for disagreement over the fact that every science must employ only standardised concepts and terminology. This is a *sine qua none* in scientific discussions lest muddled thinking is inevitable and execution of faulty policies is always feared.

II

2.4. We shall now take up one after another these questions and try to show the unique perspective we have to view them from. It has become a rule rather than an exception with most of us to refer indiscriminately to an " underdeveloped economy " as an underdeveloped country, an area, or a region as if the terms ' economy ', ' country ', ' region ', and ' area ' are all synonyms. That there is awareness of some difference between these terms is true but where precisely that differnce lies is not treated as important. A nation or a country, for instance, refers to the whole geographical territory within the effective political control of a nation. In contrast an " area " or a ' region ' usually refers to only a part of the total geographical territory under the effective possession of a country. Evidently the two terms area and regions are synonyms and are narrower than the term country. In contrast, the term " economy " is *neutral* in the sense that it can be used as an adjective and can be prefixed or suffixed with both the terms " country " and " area " or " region ". These distinctions are of immense operational significance particularly in planning the resources for economic development at national, regional or subregional levels. It is, therefore, imperative to maintain this distinction while using these terms in the literature of development economics.

III

3.5. Recent literature on newly emerging development economics is again full of instances where various authors have adopted freely and without any care different nomenclatures for calling countries such as India and Egypt as " backward ", " poor ", " preindustrial ", " undeveloped ", " less-developed ", " underdeveloped " and " developing " depending upon their convenience. This might be partly due to an attitude of undue emphasis on policy prescriptions at the cost of conceptual regard. This imbalance at some stage must be redressed. Keeping this in view question arises that by what name these countries should go by ?

3.6. Amongst many, H. Myint, for instance, thinks it more ill uminating to distinguish between the terms 'underdeveloped' and 'backward' by using the former for describing suboptimal utilization of *resources* and the latter for referring to the backward *people* of a given country, area or region.[1] He seems to equate the concept of 'underdevelopment' with the allocation of given resources among alternative uses. Viewed from this angle 'underdevelopment' becomes a species of deviation from the productive optimum defined in any sense particularly from maximum total output. As against this, he defines "backwardness" as the failure of people in the economic struggle against natural resources and economic environment resulting into low per capita income as compared to the incomes of other people.

3.7. Technically there is nothing wrong in referring to a country as "backward" since its people have failed in the economic struggle. Our humble objection against the use of this term is simply that the term "backward" conveys a definite unpleasant and derogatory meaning and casts a reflection on tht socio-cultural levels and structure of the society. Thus on the ground of political expediency at least the use of this term should preferably be avoided.

3.8. While some authors would like to call these countries "backward", there are others whose preference goes in for calling them "poor" countries. Usually this term is used to denote possession of wealth, i.e., goods and services, by an individual or a country. But, as we will see later on in this paper, the realised wealth or income is not a correct index of economic development of any nation. The correct index is the "capacity" to produce wealth rather than the wealth itself. Further a country might be inhabited by poor persons due to poverty of realised wealth but it might be rich in its potential natural and human resources. Thus it is not very unusual to find a case where the people of the country are poor but the country as such is rich. In such a situation should we call this country a poor one? It will be incorrect to consider it poor because it will mean that the country lacks the very potentiality for the development, which is does not. Similarly it will be equally unjust if we consider this country as rich. That means no deliberate attempt is needed for its development, since it is already rich, which it is not. Hence this term also seems to be inconsistent.

[1] See H. Hyint, "An interpretation of economic backwardness", **Oxford Economic Papers**, June, 1954.

3.9. Should, then, the term pre-industrial be used for these countries ? In doing so we shall be equating economic development with industrialisation alone, which might not be very sound. It is true that industrialization is a necessary accompaniment of economic development. But it is by no means a sufficient condition for economic development if industrialisation is viewed in its narrow sense of manufacturing or secondary industries. If we choose to interpret industrialisation in a broader framework so as to include all primary, secondary and tertiary industries within its ambit then there remains hardly any sense in calling some countries as pre-industrial, because some of these industries are necessarily present in almost every country.[2] Of course 'industrialisation' can yet be used in another sense so as to denote widespread application of empirical science to the problems of economic production and in this sense alone it becomes the substance of economic development.[3] But it is advisable again to reject this term on the ground of heterogenous and conflicting meanings which can be attached to this term.

3.10. Let us now examine the term "undeveloped". This term refers to a situation of absolute absence of any economic contact between different productive inputs irrespective of the presence or non-existence of these factors. In this sense perhaps there is hardly any country in the world except some regions such as Antarctic and parts of the Sahara where man has had hardly any impact and has no settled habitation.[4] Speaking *stricto senso* "undeveloped" refers to a state of zero development, zero output and zero population. With the passage of time economic development, no matter very negligible, must have taken place in each country lest such countries would seize to be our subject of interest since it will not enjoy settled habilitation.

3.11. One may, of course, argue that the term "undeveloped" is appropriate at least for those regions where there is complete absence of population. But then we will have to accept a country as *developed* if it contains population and economic activities. In this sense all countries are developed. A country in which population and economic activity per capita are likely to increase would then be called as underdeveloped. In contrast, an *overdeveloped* country will

[2] See Colin Clark, **Conditions for Economic Progress,** for the classification of industries.

[3] Simon Kuznets, "Underdeveloped Countries and the Pre-industrial phase in the Advanced countries"; Proceedings of the World Population Conference, 1954, Papers; volume V. Reprinted in Agarwala and Singh, **Economics of Underdevelopment,** Oxford University Press, 1958, p. 141.

[4] Stephen Enke, **Economics for Development,** Prentice-Hall, Inc., 1963, p. 17.

be one which is overpopulated so that income per capita hardly increases though population might be increasing alright at a given level of technology. In such a situation some poorest but overpopulated countries such as Egypt, China and India would come under the category of *overdeveloped* nations which in no way will be short of the fallacy of misplaced concreteness.[5] This proves the unsuitability of the term "undeveloped".

3.12. Should we then refer them by the term "developing". No doubt this is the latest addition to the till recently available stock of labels. But what does it mean? Is it not a reflexion on the rate of growth of the real income of the economy? Yes, it is. In this sense all those dynamic economies with positive rate of growth are "developing" economies. Hence those economies whose registered rate of growth is higher than those having a slower growth rates have still strong reasons to be called "developing". On this score then the economies of the United States, Great Britain, Soviet Union, Germany and Japan etc. should be termed as "developing". What about those countries whose growth rate is almost negligible? In fact the growth rate of these economies presently under consideration might be zero or very insignificant. Hence in calling non-developing nations as "developing" will realy mean putting the cart before the horse.

3.13. There remains to be examined now one term and that is "underdeveloped". It is a relative term which denotes comparison between two or more countries at different levels of economic performance. In this sense every country is *underdeveloped* except one on the apex of the economic pyramid.

3.14. The other sense in which "underdevelopment" may be conceived is a state where expected potentiality for development exists. Since the upper ceiling on natural resources is unknown and unlimited scope for potential scientific inventions exists, in this sense too, all countries should be treated as underdeveloped.

3.15. The third meaning of "underdevelopment" associates it with the failure to utilize fully the potential economic output warranted by existing technological knowledge. Again all the countries are underdeveloped in this sense, since no country utilizes its productive potentials to the fullest extent due to some inherent deterents in the system.

[5] **Ibid.**, p. 17.

3.16. The last meaning attached to the term " underdeveloped " may be the failure to provide *acceptable* levels of living to a large proportion of a country's population, with resulting misery and deprivation. In this sense not all but some countries are underdeveloped. But existence of misery alone cannot be sufficient condition for " underdevelopment " in the same way as it's removal is in no way the process of economic development itself. Hence on this score too, this term fails to claim a general acceptability.[6]

3.17. From the above discussion it seems that all of the terms mentioned above are equally and completely unworthy and unfit for being used for development economics. But it is not so. The philosophy of logic says that there is nothing absolute in this world. There will be hardly anything wrong if an econmist choses to call the underdeveloped countries by any name. The only necessary qualification which this term should possess is that it should be relative rather than absolute. A static nomenclature in absolute terms would be perhaps quite untenable.

3.18. The study of all social sciences rests on the bed of certain postulates and these are nothing but an assumed " norms " established by the process of best methods available to the scientist. As such the term " relatively-underdeveloped " appears to be preferable to all those discussed above. But a word of caution is needed before the final decision. Every country is relatively underdeveloped if compared with one at some higher level of economic performance. But this is not the sense in which we are going to use this term. Far from this, we prefer to use this term only for those countries which are still trapped in the low-level equilibriums. It is here that we will have to assume a " norm " in qualitative as well as quantitative terms and countries coming below this norm might then be referred as relatively underdeveloped.

IV

4.19. The recent literature on the economics of development is full of instances where the terms such as secular change, advancement, betterment, progress, growth and development are all used interchangeably. Whether this is a correct tendency can be justified only when we are clear in our minds about the concept of economic development as a process of change. We would adopt two ways for

[6] For the meanings of " underdevelopment ", see Simon Kuznet, **op. cit.,** Reprinted in **A. N. Agarwala and S. P. Singh, Economics of Underdevelopment,** pp. 135-137.

framing the definition of the term economic development. In the first place definition of some economists would be considered so as to see how far it is in conformity with the theories of economic development based on such a definition. In the second place we shall make ourselves clear about the meaning of "development" by distinguishing between things that directly fall into the category of the process of economic development and those which are indirectly associated with it as it's seeds, fruits, causes and obstacles etc.

4.20. It is not always that an economist begins his treatment of theory of economic development with a definition of the term. It is so simple, like most other terms in economics, that it seldom occurs to an economist that there is a necessity of defining it. Yet, here and there some economists have attempted to define it. According to Harvey Leibenstein *per capita output* can be looked upon as an index of development.[7] Similarly Meier and Baldwin define economic development as a process whereby an economy's real national *income* increases over a long period of time.[8] According to Professor Frankel the term "economic development" cannot be defined objectively because its conception lies only in the minds of the individuals living in a particular society.[9] Similarly for Professor Viner 'reduction of mass poverty' alone is 'a crucial test of the realization of economic development'.[10]

4.21. On closer examination of aforesaid definitions of economic development it becomes evident that there is no agreement among the economists over it. Majority of authors define "development" in terms of either "income per head" or "real total national income". However, both of these criteria are indicators of the fruits of economic development and not the process of development itself. Nevertheless there are reasons to discard the per capita index as the basis of a satisfactory indication of even fruits of economic development. First, a larger net national income is ordinarily a prerequisite for an increase in the real per capita income. Thus an increase in net

[7] Leibenstein, Harvey; **Economic Backwardness and Economic Growth**; 1960, pp. 10-11.

[8] Meier, Gerald M. & Baldwin, Robert E., **Economic Development; Theory, History, Policy**; 1957, p. 3.

[9] Frankel, S. H., **Some Conceptual Aspects of International Economic Development,** Princeton, Essays in International Finance, No. 14, 1952, and a few others contained in his **Impact of Economic Change on Underdeveloped Societies,** Oxford, Basil Blackwell, 1955.

[10] Viner, J., **International Trade and Economic Development,** London, Oxford University Press, 1953, Ch. VI, and also his "The Economics of Development", reprinted in Agarwala & Singh, **op.cit.,** pp. 1-31.

national income might be more relevant as well as more convenient single measure of development for both relatively underdeveloped and developed countries as against real per capita income.

4.22. Secondly if "per capita income" is taken as a measure of economic development, we may face a real dilemma in saying that a country has not developed despite the fact that its national income has increased but per capita income has failed to increase due to a parallel increase in population. For instance, if over a given period, country X's national income quadrupled, and country Y's national income only doubled, but population growth prevented per capita income from rising in either countries, then by the per capita income criterion we would have to say that neither country had developed. Would it not be some violence to our ordinary notions of development in denying that country X developed more than country Y? On this very ground Professor Meade has suggested total national income as a more appropriate concept to measure economic growth than income per capita.[11]

4.23. Thirdly, by adopting income per head as an index of economic development the field of inquiry is unduly narrowed by concealing the population problem. We are reminded of Kuznets when he says that the correct thing would be to emphasize the numerator and denominator, that is national income and population both rather than adopting the quotient (per capita income) as the index of economic development.[12]

4.24. Fourthly, apart from various conceptual difficulties and dearth of reliable statistics of national income or per capita income the computation of per capita income entails some difference when one divides the national income by the total population in one case and by the working force in the other. If national income is divided by total population then per capita becomes a concept appropriate for consumption, where as income per employed head is a concept appropriate to income produced. Since economic development denotes an increase in the *capacity to produce*, the emphasis should rightly be focussed on income produced rather than on income con-

[11] See Meade, J. E., **Trade and Welfare**, Oxford University Press, London, 1955, ch. VI and the review by T. C. Schelling in **The American Economic Review**, September, 1956, p. 717. For the refutal of this thesis, see Charles P. Kindleberger, **Economic Development, op. cit.**, p. 10.

[12] Kuznets, S., "Problems in Comparison of Economic Trends" in W. E. Moore and J. J. Spengler (ed.), **Economic Growth: Brazil, India Japan**, Duke-University Press, 1955, pp. 12-13.

sumed ; though it will perhaps be more difficult to get correct estimates of the total labour force than the total population.[13]

4.25. Evidently economic development should be measured in terms of capacity of a nation to produce wealth than wealth itself. A baby elephant, for instance, might be heavier and larger but is not more fully developed than a mature rabbit.[14] If income, whether total or per capita, is accepted as an index of economic development we may find some countries only half developed in relation to existing technology, scale and resource utilization but still have twice the income of other countries that are fully developed. It is due to difference in ultimate capacity of various nations for development since nature has not been equally kind to all countries.

4.26. In fact it is not very easy to understand the concept of economic development and here every thing is more complicated than most people think. For instance if we accept an increase in per capita income as an index of economic development, a country will be said to be developing if its (i) national income remains constant but population steadily diminishes in absolute numbers or (ii) real income falls by less than the decrease in population. Though absolutely declining population is distinctly rare, theoretically such situations can be conceived ; and if such a situation is described as economic development it will really be no less than putting the cart before the horse.

V

5.27. A careful perusal of the above discussion on the concept of economic development reveals that almost all the criteria of economic development advanced in the recent literature on the subject are unacceptable. In fact two basic mistakes are generally committed in this context. First, no attempt is made in the context to draw upon the writings of older economists like Adam Smith, Friedrich List, Karl Marx, and Joseph Schumpeter, who thought over the problem deeply, and are usually called 'apostles of economic development'. Secondly five distinct terms ; economic development, economic growth, economic progress, economic advancement and economic betterment, are generally used interchangeably, and are not distinguished from each other.

[13] See Kuznets, **Economic Change**, London, 1954, especially the chapter on "National Income and Industrial Structure".

[14] See B. M. Niculeson. "Underdeveloped, Backward or Low Income", **Economic Journal**, September, 1955, p. 547.

5.28. According to Alfred Marshall biological analogies are more serviceable than the mechanical ones for studying the problems relating to 'economic change'.[15] Biologists use the term 'development' for the explanation of ontogenny, or the emergence of adult organism out of the germ plasm. They define it as a "process of change whereby that which exists *potentially* becomes actual".[16] It is considered essentially a qualitative change as well. 'Growth', on the other hand, is defined as merely an increase in size, or an *entirely* quantitative process of change. Thus both these terms are analytically quite distinct, although in reality not mutually exclusive.

5.29. It is now recognized widely that economic development and factors influencing it was the central problem that fascinated the classical economists. The very title of Adam Smith's *magnum opus, An Enquiry into the Nature and Causes of the Wealth of Nations* (1776), is highly suggestive. The approach of classical economists was essentially that of 'man against nature' or, the transition from poverty to opulence. It is through this process whereby that which exists potentially becomes actual.

5.30. Like Adam Smith, Friedrich List too had a similar approach, and in his writings the concept of transition from potentiality to actuality is found to be much more explicit and clear. He visualized the economic potentialities of a nation in his concept of "productive powers" and is often quoted for his famous sentence. "The power of producing wealth is infinitely more important than wealth itself". 'Productive powers' in his mind hold a place of honour higher than the consumer goods made available at given level of 'productive powers', and he emphasised much on the modification of welfare considerations *ex visu* of the present in the interest of increasing the 'productive powers' and *Ipso facto* the *capacity to produce* of a nation in the future.[17]

5.31. From above it is evident that the main emphasis of Adam Smith (or classical economists) was on Material Capital (or Savings and Investments); while Friedrich List in order to redress the balance emphasised mainly on Human Capital (or, scientific-technology). But the establishment of the mutual interdependence between Capital and scientific technology was not done until Karl

[15] A full quotation from Marshall appears in J. N. Keynes, **Scope and Method of Political Economy,** London, Macmillan & Co., p. 149.

[16] M. Ginsberg, **The Idea of Progress,** Metheun and Co., 1953, p. 41.

[17] J. Schumpeter, **History of Economic Analysis,** p. 505.

Marx. He for the first time did it and also attempted a dynamic theory of long term economic change.[18]

5.32. This brings us to Schumpeter who became the 'apostle of economic development' in the present century. He thought that the process of economic development necessarily originates in the sphere of production through the setting up of new production functions[19] According to him the sole credit of initiating economic development in a country goes to 'alite' or 'innovators' whose creative response accepts the challenge of nature; and they by replacing Pseudo Production functions by new ones, produce the phenomenon of discontinuous 'economic change' which for ever disturbs the equilibrium position previously existing and the economic system reaches a new position of equilibrium not by 'Marginal' but by 'total' adjustments.[20]

VI

6.33. The above discussion provides us with the basic ideas underlying the concept of 'economic development'. It should essentially be conceived in terms of the setting of new production functions or 'innovations'.[21] It is then and only then possible to widen the 'production frontier' which is a *sine qua non* for stepping up the capacity to produce of a nation. Though a larger rate of output of commodities is under certain conditions *possible* even without setting up of new production function. But such increase in output would be purely *quantitative* and the actual combinations of the inputs will vary only to the extent that the factorial substitutability is possible. In contrast to this 'economic development' is a *qualitative* change involving attainment of a higher 'production possibility curves' not by varying the quantities of factors, but by varying the form of the production functions.

6.34. We may now define economic development as a structural process of change over a long period of time involving a qualitative improvement in a nation's *capacity* to produce by widening the pro-

[18] **Ibid.**, p. 573.

[19] For the concept of production functions see, Schumpeter, **Business Cycles**, New York, Mc Grow Hill Book Co., 1939 , Vol. I, pp. 38-39.

[20] See Professor G. M. Meier, "The Problem of Limited Economic Development" **Economia Internazionale.** Vol. VI, No. 4, (Reprint, p. 7); also See Schumpeter, **The Theory of Economic Development,** p. 644.

[21] See also P. Chang, **Agriculture and Industrialization,** Cambridge, Mass. Harward University Press, 1949, pp. 66-67. His classification of 'strategic' and 'induced' production function are similar to Schumpeterian concept of 'primary' & 'secondary' waves.

duction frontiers realized through the introduction of innovations and by absorbing them through a chain of actions, reactions, and counter-reactions into its economic system.

6.35. Economic Growth, on the other hand, may be defined as a process of change over a period of time involving a *quantitative* increase in the volume of output of commodities in a national economy realised through a fuller utilization of its resources by satisfying the marginal conditions. Evidently the result of economic development will always reflect itself in the indices of economic growth. Yet analytically the two concepts are distinctly separate.

6.36. "Economic Progress" is a subjective term with a much wider coverage. It includes on the one hand 'economic development' and 'economic growth' both, and, on the other hand, welfare considerations. It may be defined as a long-term process of change which enables any nation to iron out the variability of and inequality in the distributive pattern of national income, and, to procure greater supply of goods and services accompanied by *all* possible welfare facilities for *all* the individuals living in a particular society.

6.37. "Economic advancement' and 'Economic betterment' both are, in fact, vague terms which should preferably be avoided in all scientific discussions. However, the idea behind both of them is more or less similar to the concept of 'Economic progress'. Hence they may be treated at par with 'Economic progress'.

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WORKING CAPITAL AND CHOICE OF TECHNIQUES*

In discussing the problem of choosing among alternative techniques for producing a given output, attention is generally focussed on investment in fixed capital without any mention of the investment in working capital. A fuller solution of the problem would require a consideration of the differences among techniques of investment in working capital in the form of materials in process, etc. The present paper aims to study in some detail the various factors which explain these differences. It will also attempt to show that the aggregate working capital requirements, including stocks of raw materials and of finished goods at various trading points in the economy to produce a given volume of output, may be different with each technique. We shall then illustrate some of these ideas with the help of a few case studies.

I

Any production activity would involve a certain time period which has to elapse during which the inputs fed into the production process are transformed in various ways to get the final product. During this period, inputs will be held up from being available for final use, the incomplete components not being useful in the usual sense. Such a time period is generally called the period of production and is dependent upon technical factors, and hence each technique producing a particular product may have a different length of the production period. Since inputs have to be fed into the production process before obtaining the final output in advance of a time interval equal in length to a part or the whole of the production period (depending upon how late or early the particular input is fed into the process), the resources of the producing unit (or of the economy) are thus locked up in the process and it is therefore necessary to have a certain invesment in working capital besides what is invested in plant and equipment. Besides goods-in-process, it may be necessary to hold stocks of raw materials and of finished goods.

* The author wishes to express his gratitude to Professor K. N. Raj for guidance and encouragement in preparing this paper, while he was a Research Student during 1959-62 at the University of Delhi. Professor A. K. Sen, in correspondence, has kindly helped me in removing many errors in an earlier draft. His thanks are due to the Research Seminar at the Delhi School of Economics for many helpful suggestions. None of them, however, is responsible for the final version. The Institute of Economic Growth and the University of Delhi are acknowledged for the award of a scholarship.

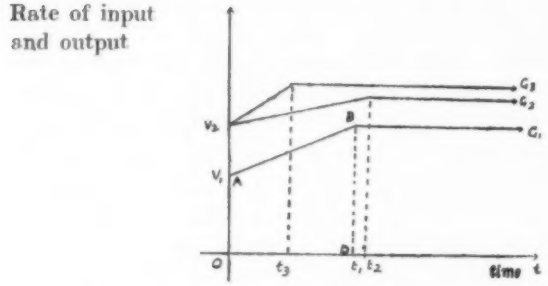
The total amount of stocks held by a unit may be divided into (a) working capital, (b) liquid capital. The amount of working capital held is the sum of goods-in-process, stocks of raw materials and stocks of finished goods which are necessary purely from the point of view of physical convenience in production, to cover the lags either in the production processes or in the supply of inputs to the firm and in the sale of finished products to the firms' customers. Liquid capital is that part of the total stocks which are held for speculative purposes. A clear-cut breakdown may not be possible in practice between working capital and liquid capital. Some minimum amount of liquid capital may be economically necessary in certain industries of a seasonal nature, for profitable operation from the point of view of the firm. For our purposes, it is working capital which is relevant.[1]

The value of goods-in-process will be determined by (1) the length of the production process, (2) the rate of input per time period and (3) the time pattern of value addition over time. To illustrate the determination of goods-in-process, let us assume that there is a single variable (or recurring) input, which can be used with two techniques T_1 and T_2 (say, two different types of equipment). In technique T_1, quantity V_1 is technically required to be taken in the process as a throughput at time $t=0$ and would be obained as cut-put value G_1 at $t=t_1$. If we assume that there are no other variable inputs added between t_0 and t_1, the difference in value between G_1 and V_1 represents the value added by the equipment or technique T_1. If production is continued through time, inputs will be continuously applied at all t, and will be obtained as output after t_1.

In technique T_2, the throughput volume is required to be larger let us say, and is equal to V_2. Let us suppose that it takes a time period of t_2 to finish V_2 into the end product, of value G_2 units per time.

[1] It will be useful to recapitulate here the distinction made by Keynes between working capital and liquid capital. According to him, "Working capital is the aggregate of goods-in-production, including such minimum stocks, whether of raw materials or of finished products, as are required to avoid risks of interruption of process or to tide over seasonal irregularities". This is to be distinguished from liquid capital which consists of stocks not technically necessary from the point of view of the production process; liquid capital is held for speculative purposes. Liquid capital will include finished goods as well as unfinished goods; some minimum amount of liquid capital must be considered to be economically necessary if production is to be carried on at all comfortably. (Keynes, **Treatise on Money**, 1930, pp. 102-145).

This may be diagrammatically represented as follows:



Technique III has the same initial throughput as Technique T_2 i.e. V_2, but has a faster rate of production (value addition) and therefore t_3 is smaller than t_2.

The value of goods-in-process may be estimated, theoretically, if V and t are known.[2] The value will be equal to the area bounded by OABD or any similar area for other values of V and t. This may be shown to be equal to $Vt+\frac{1}{2}t(G-V)$. In the special case when $V=O$ (i.e. when the initial throughput tends to zero as when the output of a previous production process is fed into this process and value addition is continuous over time) the formula reduces to $\frac{1}{2}tG$, i.e. half the value of the output during a period equal in length to the production period.

In summary. a change in technique may lead to a change in the amount of working capital (as goods-in-process) due to one or more of the following reasons: (1) a change in the length of the production period, (2) a change in the rate of output flow per unit time and hence a change in the scale of throughput volume V and (3) a change in the time pattern of value addition.

For instance, from technique T_1 to technique T_2, the period of production doubles in duration; consequently, *ceteris paribus* the period over which technically required capital is held (the period of turnover) increases twice and hence the average stock of working capital also doubles (since average value of goods-in-process is equal to half the value of output corresponding to the period of production). If, in addition, the change in technique also necessitates the

[2] Normally given V, G is determined, and vice-versa, except in cases where V/G is different in each technique and some V is wasted. Then the path of gross output must also be specified. (V/G is the variable input-output ratio).

volume of throughput of factors into the pipeline to increase, the volume of working capital will again increase. Similarly, if the time pattern of inputs changes from, say, a constant pattern to one with an initial cluster of inputs (early in the production period), the working capital will have to increase.

II

The time element enters into production processes in other ways, too. So far, we have considered the lapse of time during the actual production process and the consequent amount of materials in process which are locked up in the pipeline as a part of the working capital. In any individual production unit much larger stocks, compared to the goods-in-process, are usually held as raw materials and as finished goods. This part of the working capital also is intended to satisfy a lag, transactionary in nature, and is necessary from the point of view of smooth production. (This has nothing to do with the speculative activities of the manufacturer). Inputs which are to be fed at any particular point of time t in the production process cannot be obtained instantaneously at the place of production. A time-lag, called lead-time, which may differ for each input, should elapse before it is obtainable from input-sellers. This differs again from technique to technique depending upon the average weighted lead-time of the combination of inputs which each technique entails. Similarly, finished goods, too, cannot be despatched as they come out of the pipeline and some working capital is necessarily invested. Now we shall examine in some detail the estimation of these components.

The amount of raw material stocks for transaction purposes will depend upon the average rate of production per time period and the lead-time. In each technique the working capital will be different because these variables are likely to be different from technique to technique. The average rate of production (and hence the average rate of depletion of the raw material stocks) depends upon the technical factors (considered above), and the average lead-time depends upon the overall organizational set-up in the economy in regard to raw material location, transport system, trade channels, etc.

Even in the presence of lead-time it may not be necessary to hold any raw material stocks for a producing unit, if two assumptions are satisfied: (1) The average cost per unit in ordering inputs is constant whatever the level of order. Similarly, when machines are to be set up for a long run, the setting up costs are constant. (2) There is perfect certainty about rate of demand per time period,

and about arrival of inputs, etc. It is often found desirable to hold working capital in the form of raw materials because these two conditions are not satisfied.

Economy in procurement costs: It is generally experienced that it would be cheaper to buy the various items of inputs in lots larger than what would be just sufficient for one production period. These economies occur through a reduction in unit costs per item of input in placing and executing orders or in setting up costs. The optimum lot size is probably different for different techniques because of differences in optimum sizes of individual firms associated with each technique. The reduction of costs in procurement is, beyond a certain point, offset by increasing costs of storage and an optimum is struck with the cost of storage as constraint.

Uncertainty: Manufacturers also keep a buffer stock of raw materials and of finished goods to guard against unexpected increases in demand. Such unforeseen demand changes cannot be met immediately because of the presence of a lag between ordering inputs and obtaining its delivery from input suppliers. For precautionary reasons, producers might find it more convenient to hold stocks larger than just sufficient for the production period.

It should be pointed out here that the length of lead-time is likely to be significantly different in different techniques. For a small producer who himself buys his inputs and sells his output in a small area, assuming that raw materials (and their markets) are evenly spread, the lead-times are likely to be small. For a big corporation which usually goes for a very capital-intensive technique, the area of operations is very large and it is not normally possible to arrange the supply of materials without long lead-times. Given the choice of a particular technique in any industry, the lead-times of its various inputs depend upon the geographical distance of raw material sites from the fabrication and consumer centres, the efficiency of the transport system in general, the trading practices, etc. For instance, choosing a more mechanized technique of steel-making (which also involves a large-size plant in a centrally located area) will mean much larger working capital stocks with a bullock-cart transport system than with a railway or road transport system. Similarly, if the bulk of the materials have to be imported it would be necessary to hold relatively larger working-capital stocks. Again, if labour-intensive techniques can be spread in a somewhat self-sufficient manner in villages, with dispersed, locally available raw materials and with local markets, the aggregate working capital can be kept low. On the other hand, if those techniques have the same overhead organization in raw material

procurement and output distribution as the capital-intensive techniques, working capital requirement may be even more than the capital-intensive techniques.

To evaluate the *aggregate* working capital requirement of a certain technique, it is necessary to consider the stocks outside the individual production unit. When stocks in trading channels, etc. are considered, each technique might give a different total of working capital *throughout the economy*.

Stocks of finished goods : Just as a certain stock of raw materials was shown to be necessary to cover the transactionary lag a similar stock of finished goods will also be necessary in each production unit, to cover the purely physical transactionary lag, when we abstract from the speculative activities of the producer. Generally, it will not be possible, whatever the technique used, to despatch products as they come out of the pipeline. Analogous to the lead-time of input supplies, we may consider the marketing lag of output disposals. There are two grounds on which they may be considered to arise.

Firstly, it may not be possible to perfectly synchronize timewise the flow of output from the pipeline and its disposal to customers. Delays, inadequacies and imperfect coordination in transport facilities are quite normal and account considerably for the transactionary lag. Apart from this, it may be convenient and economical, both for the producer and the consumer, to have shipments of a certain size of consignments (these costs also might have an average varying to size) rather than a continuous despatch as the product comes out. Therefore, even in the case of finished goods stocks, factors like geographical distance of the market, transport system, organization of trade, etc. become important. For example, if each village is just selfsufficient in say, the production of cotton cloth from raw cotton available in each village, no working capital need be invested in transporting the product from the place of manufacture to the place of consumption. But, if centralized, capital-intensive production is undertaken in a few industrial towns, considerable investment may be necessary all along the distribution channel. Given the technique of production and its organization, better the transport system lesser will be the requirements of working capital. In the above paragraph we have assumed that there is no discrepancy between the time pattern of production and the time pattern of consumption and that the demand pattern is known with certainty. This assumption may not be satisfied normally and manufacturers may find it more profitable to have a uniform rate of pro-

duction and to accumulate some stocks of the finished goods, even though demand fluctuates. This would happen even in normal times of business activity without pronounced cyclical effects. The stocks which are held under this category will probably be more important in the case of capital-intensive techniques, which cannot be immediately and easily adjusted to change in demand than in labor-intensive techniques.

III

We shall now summarize the results of a few case studies in textile weaving (done during 1960) in order to estimate the ratio of various components of working capital. The novelty claimed for these results is that they eliminate the speculative elements in stocks. The results are based on detailed discussions with the producers and not on balance sheets which may include speculative figures.

The following table summarizes the results of each technique. The number of cases studied is given in brackets. The proportion of goods-in-process to gross output varies from 0.019 in the handloom technique to 0.043 in the factory powerloom technique and to 0.036 in the automatic loom technique.

TABLE 1

Technique	Goods-in-process as % of working capital	Goods-in-process to gross output	Goods-in-process to net output	Working capital to gross output	Working capital to net output
Fly-shuttle handloom (13)	10	0.019	0.05	0.183	0.490
Frameloom (2)	18	0.040	0.13	0.215	0.713
Pedal loom (2)	17	0.027	0.10	0.159	0.553
Semi-automatic handloom (1)	21	0.045	0.23	0.217	1.124
Factory Power loom (3)	34	0.043	0.16	0.127	0.472
Factory automatic Powerloom (2)	18	0.036	0.11	0.206	0.648

However, absolute ratio is very low in all these techniques and it would show that the influence of goods-in-process in aggregate working capital determination is very small. In contrast, it is generally seen that this ratio will be very high in industries like machine-tools, ship-building, etc. and changes in technique will influence working capital to a greater extent there.

The differences in the ratios of goods-in-process to gross output among techniques are not very striking because the increase in throughput volume of input is nullified by the faster rate of production in the powerloom techniques, and therefore, the period of production does not increase in the same proportion as throughput volume.

From the ratio of working capital to net output it may be seen that the factory power loom has a lower ratio. If we take into account goods-in-process alone, the handloom has the lowest ratio. Since the estimates of working capital are not ideally determined, and since they cannot effectively take into account the working capital held outside the individual unit, it may be more advisable to consider the ratio of goods-in-process to net output as a determining criterion.

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ECONOMIC HISTORY : AN INTRODUCTORY NOTE

THERE are three terms which usually cause confusion among the students of Economics. They are 'History of Economic Thought,' 'History of Economic Analysis' and 'Economic History'. The first of these is a study in the development of economic ideas over the recorded history. The second term, on the other hand, is not so much interested in *what* was argued as in *how* a thinker argued and *what* tools of analysis he used in doing so. As against this, Economic History has a much different subject. It is a study in the economic activities of man over the centuries. J. R. Hicks is, however, more precise on this point. He writes: "Economic History is often presented, and rightly presented, as a process of specializaion ; but the specialization is not only a specialization among economic activities, it is also a specialization of economic activities (what are becoming economic activities) from activities of other sorts".[1]

Economic History, as a distinct branch of knowledge, came into being in Germany and England about one hundred years ago. It then focussed on questions of economic organisation. The German historical economists were concerned with understanding and anticipating the history of organisational forms. In England, the Fabian Socialists (as also in America the institutional economists) took as a major task the study of the human associations in economic life which preceded and might succeed capitalism. Thus, Weber studied ancient slavery, Schmoller and Unwin concentrated on guilds and town economies, Cunningham and Lipson were attracted by mercantilism and the State Policy, Tawney studied the forms of agrarian organisation and Commons and the Webbs wrote the histories of labour unions.[2] In spite of this, Economic History continued to be the domain of historians until after the World War II. As J. R. T. Hughes says: "By the early 1950's the profession of economic history was largely being recruited from the ranks of graduate students in 'straight' history. The small number of ranking economic historians trained as economists age (d ?) 45 to 65 is dramatic evidence of this history. By 1950 the major text book used in undergraduate courses

[1] **A Theory of Economic History,** (Oxford University Press, 1969), p. 1.

[2] "A Word from the Programme Committee", **The Journal of Economic History,** Vol. XXX, No. 1, 1970, p. 2.

remained largely unchanged since 1924 ".[3] But, as Hughes continues: " Young men who came to economic history from Economics in the 1950's and early 1960's ... had their primary training in the 'new' and the 'new-old economics'. They seemed to understand little of methods and motives of the old-time 'fact' men in economic history, and went to work rewriting economic history, revising much of the older interpretation, but also pushing the old framework aside altogether and producing entirely new information by new methods, statistical techniques and data processing ".[4] Hughes calls this as the 'new' Economic History. Others call it 'Econometric History', and still others 'Cliometrics' (From 'Clio', the Muse of History).

The first systematic attempt to study Economic History on these lines was made by Alfred H. Conrad and John R. Meyer with respect to the profitability or otherwise of the institution of slavery in Antebellum South in terms of modern capital theory. It was usually held that it had become unprofitable there as the prices of slaves were rising at a greater rate than the prices of goods which the slaves produced. By using simple statistical concepts of range and central tendency, Conard and Meyer succeeded in refuting this notion. They divided the institution of slavery into two functions. One function relates inputs of Negro slaves (and the materials required to maintain the slave) to the production of the Southern staple crops, particularly cotton. The other function describes the production of the intermediate good-slave breeding. The authors calculated the money expended by the slave-owners on the maintenance of slaves, supervision of their work, etc. They also calculated the income derived by the slave-owners from the sale of the commodities which the slaves produced. However, the female slaves besides producing the commodities, produced something more—they produced children who could also be sold as slaves, which in turn, brought additional income to the slave-owners. Arguing on these lines, Conard and Meyer conclusively proved that on the eve of the Civil War, slavery was " apparently about as remunerative as alternative employments to which slave capital might have been put ".[5]

[3] " Fact and Theory in Economic History ". Andreano, Ralph L. (ed.), **The New Economic History Recent Papers on Methodology,** (John Wiley and Sons, Inc., 1970), p. 48.

[4] **Ibid.**

[5] **The Economics of Slavery and Other Studies in Econometric History,** (Chicago: **Aldine, 1964).**

Inspired by this study, a number of scholars have gone in for this sort of Economic History. Among others, the names of Lance E. Davis,[6] Douglas North,[7] and Robert W. Fogel,[8] may be mentioned.

Thus, at present there are two approaches to Economic History-the 'traditional' and the 'new'. Two elements which are an integral part of the 'new' approach are said to be absent in the 'traditional' approach viz., (i) an overruling interest in quantification; and, (ii) the use of economic theory manifested by the reliances on hypotheses and figments. There is, however, nothing novel about quantificaion. Robert W. Fogel himself agrees that this feature is not altogether absent in the 'traditional' Economic History.[9] Similarly, economic theory, where it was useful, was also employed by the 'traditional' economic historians in price, monetary and banking histories and other fields. However, the distinguishing feature pointed out by Fritz Redlich seems fairly acceptable. He says: "... the old approach deals essentially wih institutions, and with processes only to the extent that the latter took place within institutions.... The new approach, in contrast, often goes directly at macroeconomic processes, thus disregarding institutions".[10]

Redlich is not happy with the 'new' approach. He has divided it into there parts[11]:—

(i) Those 'new' historians who write like 'traditional' quantitative historians but use much more refined mathematical tools. Their works are real history (he includes Douglas North in this group).

[6] Refer, for example, to his articles: 'Capital Immobilities and Finance Capitalism, **Explorations of Entrepreneurial History,** Vol. I, No. 1, 1963; "The Investment Market, 1870-1914: The Evolution of a National Market", **The Journal of Economic History,** Vol. XXV, No. 3, 1965; and "The Capital Markets and Industrial Concentration: the U.S. and U. K. a Comparative Study", **Economic History Review,** Vol. XIX, No. 2, 1966.

[7] **The Economic Growth of the United States, 1790-1860,** (Prentice-Hall, Inc., Englewood Cliffs, 1961).

[8] **Railroads and American Economic Growth: Essays in Econometric History,** (The Johns Hopkins Press, Baltimore, 1964).

[9] "A Provisional View of the 'New Economic History'", **American Economic Review, Papers and Proceedings** (May 1964, Number), p. 377.

[10] "'New' and Traditional Approaches to Economic History and Their Interdependence", **The Journal of Economic History,** Vol. XXV, No. 4, 1965, P. 482.

[11] **Ibid.,** p. 491. For a review of these criticisms refer to David, Lance, E., "And it will never be literature", The New Economic History: A critique". Andreano, Ralph, L., **op. cit.,** pp. 75-78.

(ii) Those 'theoretical' new historians who are primary concerned with quantification and the testing of hypothesis and write *near* history (he puts Lance E. Davis in this group).

(iii) Those 'counterfactual' historians who emphasize quantification but depend on figments. They do not write history and only produce historical models (he includes Robert W. Fogel and Alfred H. Conrad and John R. Meyer in this group).

But Redlich agrees that the 'new' approach has come to stay. As such, he thinks: "... with the exception of a few extraordinary genuises, such as Joseph Schumpeter, the historical and the mathematical bents of mind are usually not present in one person. Thus, for this reason alone, the two modern approaches to economic history have to become complementary and should be recognized as such".[12] This view, it seems, is correct.

It is necessary to point out here that so far Economic History has been studied in India primarily on traditional lines. The 'new' approach has yet to become popular. It is true hat some persons have used the tools of mathematics and statistics in their studies. But such studies are almost confined to the agricultural sector and to the twentieth century. An outstanding example of this is George Blyn's *Agricultural Trends in India*, 1891-1947: *Output, Availability and Productivity*, (University of Pennsylvania Press, Philadelphia, 1966).

As the end, a question may be raised : Why should Economic History be studied ? The simplest and most important answer is that it satisfies the curiosity of Man. Any branch of knowledge which is capable of doing this ought to be pursued and Economic History is one such branch. Secondly, knowledge of a country's past is useful for solving the problems confronting it in the present and the future. As Dr. D. R. Gadgil observes: "The more I study the economic, political and social situation in India, the more I am impressed with the need to be fully aware of the continuing forces which have shaped the situation through the past. Because Indian Society through recent centuries has suffered no cataclysmic or revolutionary changes, in our socio-economic structure and in all motivations, in procedures, habits of thought and patterns of conduct, influences from the past appear still to play a very large part".[13]

[12] "Potentialities and pitfalls in Economic Hitory", **ibid.**, pp. 97-98.

[13] Gadgil, D. R. and Namjoshi, M. V., **Origins of the Modern Indian Business Class an Interim Report,** (Institute of Pacific Relations, New York, 1959), Foreword, p. iv.

Thirdly, Economic History enables us to test the correctness of economic theories. The Malthusian theory of population, for example, lays down that the increase in population outstrips the increase in food production which ultimately results in human misery. A study of Economic History shows that this need not necessarily happen. In the nineteenth century in Western Europe, for instance, the increase in population was accompanied by an increase in prosperity.

Thus, Economic History is a useful branch of knowledge. It is common in both Economics and History. But the contribution of the economists has started appearing only of late. The approaches of the economists and the historians tend to be different. But the two approaches should be treated as complementary rather than competitive.

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RURAL LEADERSHIP AND RURAL CREDIT —A RELATION IN THE INDIAN ECONOMY

MANY things can be said about the rural economic problems in India. Yet what is important in a short article is not to say them all, but to pick and choose, to leave most things unsaid, so that attention may fall on a few things that are more important than on the rest.

Nothing perhaps is more important for the success of the plans and programmes for rural development in our country than to tackle successfully the rural indebtedness in India. It is so great that it is often styled as the bane of Indian agriculture. Those who have eyes to see, let them turn to most of villages in India and they would find crushing poverty and utter destitution with perhaps, a sprinkling of wealth here and there. Rural indebtedness and rural poverty form a vicious circle because one leads to the other *ad infinitum*.

One of the essential requirements for setting Indian agriculture on the road to progress is to promote the growth of an enlightened leadeship in the rural areas to create, or widen, the channels through which credit and essential physical inputs may evenly flow to the agricultural sector. Not nearly sufficient discussion seems, however, to have taken place on the question of how to create an enlightened leadership in the countryside to pioneer progress.

The present study is an attempt to consider very briefly how sound rural leadership can be made available and how it may serve fruitfully to tackle rural indebtedness. The present author believes that the existing organisations which have been providing leadership in our vast countryside need re-orientation and a "New Look" is required to utilise these organisations for any fruitful use to tackle the problems of rural indebtedness in the context of economic development of our country. At the very outset one may note however, within a short compass, it is not possible to make a comprehensive analysis of such sound rural leadership organisations—their nature, role and various problems and for this, we have made a short analysis of all these. Then, in the end, we have given certain mathematical notes showing the relations between rural leadership, growth and different types of facilities extended to the rural people of which rural credit is a part.

Analysis :

Would it be sufficient to provide credit in the rural area ? Our answer is "NO". We will have to see how the credit is used, where

it is used and what it should be. For this, we need among other things effective rural leadership organisations to see that the credit is properly used. Let us now explain how effective rural leadership can be made available and how it can serve fruitfully for tackling the problem of rural indebtedness in the following way:

Let us assume,

S=Different facilities extended by the Government etc. of which rural credit is a part to improve the lots of the rural people in an area ABCD;

L_1, L_2, L_3=Leaders of the area ABCD (These leaders can either be elected or selected considering various factors in each case. They will have to work under the control and guidance of Rural Leadership Organisations at the Centre, State, district and block levels. The numbers of leaders in the area ABCD would be determined by the needs etc. of the area) and

f_1, f_2, f_3=Followers of the Leaders in the area ABCD.

Then, f_1, f_2, and f_3 should apply through L_1, L_2 and L_3 respectively for getting S. And L_1, L_2 and L_3 may forward the applications of f_1, f_2 and f_3. Then, f_1, f_2 and f_3 get S.

L_1, L_2 and L_3 are not passive leaders in the proposed system. These leaders in their areas should have to satisfy a minimum amount of output over a particular period of time determined beforehand by the Rural Leadership Organisations with the prior consultation with these leaders and if they fail, they will cease to be the leaders and some new ones would come in their places. Only in some cases, the rural leadership organisations may consider the justification of allowing the leaders to continue even in case of their failures for which they are not really responsible. The "minimum amount of output" is the output produced by the followers including the leaders themselves in their respective areas over a fixed period of time to justify the worth of leadership. This "minimum output" is not the output which the leaders only produce over a fixed period of time but this is the total minimum output which the followers including the leaders themselves produce over a fixed period of time and this is the output which must be produced by the leaders with the help of their followers to justify the worth of their leadership.

Therefore, L_1, L_2 and L_3 will consider twice before forwarding the applications of f_1, f_2 and f_3. Moreover, they will have to see whether credit is utilised for the purpose for which it is intended. They know f_1, f_2 and f_3 and hence, it would be easy for them to look

after the utilisation of the credit. Moreover, these leaders in the case of repayment are able to help the Government officials etc. and this may help to a great extent to get back the loan, if provided.

L_1, L_2 and L_3 are well acquainted with f_1, f_2 and f_3 and hence, f_1, f_2 and f_3 need not bother about formalties for getting S. L_1, L_2 and L_3 will do these for them. Therefore, a healthy attitude will develop between the leaders and their followers. These leaders under the guidance and control of Rural Leadership Organisations can fight against the evil weapons of the money-lenders etc. It may be easy to tackle the evil designs of speculators etc. with the help and guidance of these leaders. Moreover, these leaders will have to look after the increase of the output in their areas. Therefore, other things remaining the same, the process of income generation will start. The area (ABCD) may in the years to come, get rid of stagnancy. Therefore, the net result is positive.

The proposed co-operative credit societies are not managed by a managing committee guided and controlled in most cases by certain influential persons in the area ABCD to serve their own interests at the expense of the majority. These L_1, L_2, and L_3 will remain in the executive committee under guidance of Rural Leadership Organisations.

These leaders are accountable for their deeds. They will have to see how the facilities are utilised under the able guidance of Rural Leadership Organisations. In the case of any improper utilisation they may report the same to the Body of Facilities and Body of Disputes. The former body will have to see that the facilities are actually implemented and the latter body will try to settle disputes between the leaders and their followers. Both these bodies will be under the control and guidance of Rural Leadership Organisations at the State and Centre levels.

Therefore, the net result would be: (i) the credit (as well as other facilities) may be properly utilised ; (ii) the output in respective areas will go on increasing other things remaining the same ; (iii) the process of income generation will bring dynamic forces to work for the prospect of the rural economy ; (iv) the process of repayment would be quick, simple and easy ; (v) the process of giving loan etc. would be easy and related to increased output ; (vi) the influence of speculators, money-lenders etc. would be mitigated and (vii) the prospect of co-operatives under the proposed form would appear to be bright.

We believe that for effective utilisation of rural credit, we will have to create organisations in the rural areas which may be called

as Rural Leadership Organisations with cadre of leaders working on war-footing at the base to provide the required leadership in the rural areas. Tre problem of rural development is theirs. So, if we do not allow them to tackle their own problems in their own ways, we will simply invite complexities and all that. That does not mean that we are ignoring State responsibility. The State should definitely provide guidance, finance etc. and these will act as external forces to break the vicious circle of stagnation in the rural economy. But that is not all. The internal forces are required in this connection. The leaders under the guidance of the proposed Rural Leadership Organisations will have to provide the rural areas with these internal forces with the help of their followers and these two forces will have to be properly integrated to bring prosperity in our vast countryside.

The leaders in our proposed system cannot play the role of idle leaders who only rise to the occasion at the time of elections. They will have to satisfy at least the 'Minimum output criteria" in their respective areas to justify the worth of their leadership. Hence, it may be expected that for their own interest at least, they will take care to see that the credit etc. are properly utilised in their respective areas. With proper utilisation, the process of income generation starts, other things being equal, and therefore, the power to save of the rural people of such areas is increased and if there is will to save, the volume of internal resources of the co-operative credit societies and of these areas at large will be increased and this may help the process of capital formation. Therefore, we suggest the creation and the introduction of the proposed Rural Leadership Organisations at least, in some selected areas on experimental basis; according to the nature of experiences, the system may be modified, if required, in the years to come, for linking rural credit etc. with such leadership available through such leaders under the guidance and control of Rural Leadership Organisations in the context of overall development of the country.

There can be no greater mistake than to carry on an impression that a new heaven and a new earth would soon be created in the rural areas th.ough our proposed system. The problems of India, particularly rural India, are so numerous, so gigantic and so deep rooted and the resources so limited, that only a sustained herculean effort lasting over a long period can solve them. Far from finding a panacea for all ills including rural indebtedness, our proposed system may be able only to break the crust, though a thick one, of the rural problem.

II

Mathematical Notes :

We have made an attempt to represent precisely and analytically the relationship between rural leadership, growth and different types of facilities of which rural credit is a part. We have also given a note on the 'Minimum Output Criteria"—its relation to growth over time.

(i) We know that

Force=Rate of change of momentum

=Rate of change of (mass X velocity)

$$= \frac{d}{dt}(mv) = V\frac{dm}{dt} + m.\frac{dv}{dt}$$

So, we can write,

G=Growth=Rate of change of (Leadership X rural people)

$$= \frac{d}{dt}(RL) = L\frac{dR}{dt} + R.\frac{dL}{dt} \quad \ldots \ldots \ldots \ldots (i)$$

(ii) Let,

M=External Force (different types of facilities of which rural credit is a part extended to the rural people to uplift the conditions of the rural people by Government etc.).

Now, we can say,

The growth G will be accelerated if

$$G = L\frac{dR}{dt} + R\frac{dL}{dt} + M \quad \ldots \ldots \ldots \ldots \ldots \ldots \text{(ii)}$$

(iii) The growth G will be retarded if

$$G = L\frac{dR}{dt} + R\frac{dL}{dt} - M \quad \ldots \ldots \ldots \ldots \text{(iii)}$$

(iv) Let,

n=any positive integer and

F=external force per unit of time

clearly,

$$G = \frac{d}{dt}(\text{leadership X rural people}) + F.t.$$

$$= \frac{d}{dt}(L X R) + F.t$$

$$= L\frac{dR}{dt} + R.\frac{dL}{dt} + F.t$$

But $R = nL$

Then,

$$G = 2nL \frac{dL}{dt} + F.t$$

Also, $L^2 = t + c$, for we have assumed a parabolic path for the relation connecting L and t. The above path is to be assumed because leadership will change as the increase of time but this change is not uniform.

Or, $L^2 - t = c$.

Or, $2L \frac{dL}{dt} - I = 0$, or $2L \frac{dL}{dt} = I$ or, $2nL. \frac{dL}{dt} = n$

$\therefore G = n + F.t$... ... ... (iv)

(v) If F is variable, then

$$G = L \frac{dR}{dt} + R. \frac{dL}{dt} + \frac{dF}{dt}$$

clearly, $R = nL$;

$$\therefore G = 2nL. \frac{dL}{dt} + \frac{dF}{dt}$$

Also, $L^2 = t + c$ or, $L^2 - t = c$ or, $2L. \frac{dL}{dt} = I$.

or, $2nL \frac{dL}{dt} = n$

$$\therefore G = n + \frac{dF}{dt} \quad \ldots \ldots \ldots \ldots \quad (v)$$

(vi) Let,

I=Internal forces originated from L in the rural area and

E=External effects originated from the summation of different facilities of which rural credit is a part extended to the rural people to increase agricultural output.

Since, G is dependent both on I and E, we have

$G = \lambda.I.E. + \lambda_1$, where, λ, λ_1 = constants,

$$\text{or, } \frac{dG}{dt} = \lambda \left(\frac{dI}{dt} . E + I. \frac{dE}{dt} \right) \quad \ldots \ldots \ldots \ldots \quad (vi)$$

From our original assumption, I and $\frac{dI}{dt}$ are always positive i.e., efficient leadership is always increasing.

Hence, $\frac{dG}{dt}$ is positive, if either E and $\frac{dE}{dt}$ are both positive,

or, $\frac{dE}{dt}$ is negative, but $\frac{dI}{dt} . E > I. \frac{dE}{dt}$.

Therefore, we conclude that G may ply on merrily through efficient leadership even when rate of E is diminishing.

(vii) Let,

M=Miinmum output at time t,

M_0=Minimum output at time $t=t_0$,

M_1=Minimum output at time $t=t_1$ and so on.

And,

M=f (N, S, B, L and E) where M=minimum output which the leader in the proposed system will have to satisfy in a period t;

N=different types of facilities of which rural credit is a part extended to the rural people by the Government etc. from time to time;

S=nature of the soil over a particular period of time in a particular rural area;

B=nature of behaviour of weather over a particular period of time in a particular area;

L=Nature of Leadership available in a particular area over a particular period of time and

E=other factors.

clearly,

$$\frac{dM}{dt} = \frac{df}{dN} \cdot \frac{dN}{dt} + \frac{df}{ds} \cdot \frac{ds}{dt} + \frac{df}{dB} \cdot \frac{dB}{dt} + \frac{df}{dL} \cdot \frac{dL}{dt} + \frac{df}{dE} \cdot \frac{dE}{dt}.$$

Hence,

$$\left(\frac{dMo}{dt}\right) t = t_0 = \left(\frac{df}{dN} \cdot \frac{dN}{dt}\right) t = t_0 + \left(\frac{df}{ds} \cdot \frac{ds}{dt}\right) t = t_0 + \left(\frac{df}{dB} \cdot \frac{dB}{dt}\right) t = t_0 + \left(\frac{df}{dL} \cdot \frac{dL}{dt}\right) t = t_0 + \left(\frac{df}{dE} \cdot \frac{dE}{dt}\right) t = t_0.$$

If we assume,

$S = B = L = E =$ constant for the period $t = t_0$, we have

$$\left(\frac{dM}{dt}\right) t = t_0 = \left(\frac{df}{dN} \cdot \frac{dN}{dt}\right) t = t_0.$$

By similar arguments,

$$\left(\frac{dM_1}{dt}\right) t = t_1 = \left(\frac{df}{ds} \cdot \frac{ds}{dt}\right) t = t_1 \text{ and so on.}$$

Now, if G = Growth, then

$M = AG + W$ where A and W are constants.

Then, we get, $\frac{dM}{dt} = A. \frac{dG}{dt}$

Hence,

$$\frac{dG}{dt} = K\left(\frac{df}{dN} \cdot \frac{dN}{dt} + \frac{df}{ds} \cdot \frac{ds}{dt} + \frac{df}{dB} \cdot \frac{dB}{dt} + \frac{df}{dL} \cdot \frac{dL}{dt} + \frac{df}{dE} \cdot \frac{dE}{dt}\right) \quad \ldots \quad \ldots \quad \text{(vii)}$$

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ESTABLISHMENT AND DEVELOPMENT OF RURBAN CENTRES*

MAN is a creature of the Society of the 'Mass'. The last word can be defined as 'Mutual Association in the Society's Structure'. He always tries to find a suitable place to develop his abilities and capacities. He has to mould his habits, and occupation according to the needs of Society. In doing so he prefers to have a close association with his fellow-beings, with the result, he adds to the cumulation of the gathering. Thus the dwelling places of human beings begin to grow in size as well as in amenities which they provide. According to Finch and Trewartha, settlement refers to the Characteristic groupings of population into occupance units, together with the facilities in the form of houses and streets which serve the inhabitants ![1] But in the present day world, the amenities are manifold which will be dealt with later. People are more and more attracted towards comforts and luxuries. Soil to till, has very little attraction, also because it yields a very low economic dividend comparatively. It is also open to the vagaries of nature. Consequently population flows to the City in search of both. Moreover, the availability of some economically important mineral and the location of some industry either accidentally or as a result of purposeful planning, helps in the growth and areal expansion of cities. The contiguous area surrounding the city may also be studied with industries having access to financial resources and the readily available skilled labour. Thus it forms the tentacle of the prime city.

Kingsley Davis includes sophisticated cultural hetrogenity, common government, feeling of community in the definition of a city.[2] He treats traffic congestion, air pollution, agricultural retreat, water shortages and waste of resources on an unimaginable scale as a by-product of the economic and technological gain.[3] He envisages the population of Indian Cities by 2000 A.D. to be 36 to 60 million.

* Presented at the Seminar on 'Market Towns and Spatial Development' sponsored by the National Council of Applied Economic Research, New Delhi in April, 1971.

[1] Finch, V. G., C. T. Trewartha, D. H. Robinson, G. H. Hanmond. **Elements of Geography**—McGraw Hill Book Co., 1957, p. 545.

[2] Gibbs, J. R., **Urban Research Methods**—Von Nostrand & Co., 1966, p. xviii.

[3] **Ibid.**, p. xxi.

Generally population of a city indicates its types. But it is not true always. For example in U.S.A. the minimum for a city is very less. But in India even villages accommodate many thousands. So the characteristics and the classification of cities are based on the administrative set up, functions, population size and its agglomeration or cluster. In India population cannot be the only criteria. But the administrative set up and the various functions performed easily form the differentiating criteria.

In our country the sizes of even the villages are so large at times that in the absence of proper amenities their conditions are apalling. As Davis has forecasted if by the year 2000 A.D. some of the cities of the country would swell to that size one cannot imagine the hardship which we may have to face. As a matter of fact India cannot afford to have many million cities even at presest. Keeping in mind that in any developing country the size of a city goes on inflating with the high pressure of industrial growth, we have to plan in such a way that the further growth is checked by some constructive and phased project.

This can be achieved by: (a) promulgating suitable ordinances on the flow of population into the city, (b) establishing suburbs adjoining cities and (c) establishing satallite towns or market centres. The first is almost impossible as under any democratic set up and in a progressive country, industries and commerce are bound to develop and with it the population. The second alternative is materialising in most of the countries. But it involves the danger of the empty cone being filled up and the conurbation to be formed.

The last is a permanent remedy for all. In India the idea was first given by Prof. R. L. Singh. Such towns should be kept apart by a strip of 5 miles of agricultural belt both from the metropolis and among the satellites themselves.[4] This is essential to prevent the development of conurbation.

Now the problem arises about selection of such satellite towns, or centres which are generally market centres. It at times depends upon the nearest biggest city. Butler and Fuguitt[5] on the critical analysis of Hassingers study propose that such centres are found either near large city when it functions as a commuting centre or at the end of the U-Shape pattern. The growth is lacking in between. The more the centre is away the greater it gets a chance to

[4] Singh, R. L., **Bangalore**, p. 116, N.G.S.I., p. 116.

[5] Butler, J. E., Fuguitt, G. V., "Small town population change and distance from larger towns—A Replication of Hassingers Study", **Rural Sociology**, Sept., 1970, Vol. 35—Pt. 3, p. 390.

grow as a wholesale market. But Hassingers view is, if the main city is slightly larger then a positive relation exists between the distance and population change and if the main city is considerably larger then there is a negative relation with the centre.

Large cities whose population is more than 20,000 cannot be selected, as they have already developed and expanded. In India there are 1927 towns whose population do not exceed 20,000 according to the census of 1961. So market towns can be developed selecting such centre which is in between a town and a village. It has many of the facilities of a town, but it cannot be called a city. Such centres can be called Rurban Centres. In Britain Rurban centre is a small town with less than 5000 persons.[6] In India population cannot be the only criteria. We have to take into consideration the service rendered by the particular center and also the amenities available in the particular centre. To call a centre a Rurban centre some basic qualifications are needed. This might change from region to region, for the amenities available may be different, from one region to another. The index is the service which it performs in the area. By getting the percentage of persons employed in transport and trade with that of the region the C.I. or the centrality index can be found. By plotting these along one axis and the amenities found along another the Rurban Centres can be distinguished. In Mysore a minimum C.I. of 0.125 and the availability of 5 amenities, in a centre is considered to be the essential requisite for a Rurban Centre.

In certain cases the origin of these centres may be accidental. At the same time it cannot be created only by Government planning. It should be allowed to grow slowly and at a uniform pace. No doubt it must be provided with the infrastructure like light, water, drainage, and communication facilities. It will then look after itself. The character and function develop by themselves. The so-called Regulated Markets established by the Government of India have faulty locations. They are generally at present in big towns or cities which mostly do not need one as their structure have already become so complex that a super bazar might serve a better purpose. Regulated Markets can better fit in a Rurban Centre.

A Rurban Centre may or may not be a municipal area. At the same time it should not adjoin any big city lest there is a danger of it being eclipsed. It should be placed at a sufficient distance from

[6] Dickinson, R. E., **City Region and Regionalism**, Routledge and Kegan Paul, p. 77.

[7] Vishwanath, M. S., 'A Geographical Analysis of Rural Market and Rurban Centres in Mysore'—An unpublished Ph.D. Thesis.

other Rurban Centres. It would be better if it is in a cluster of villages which are mainly agrarian and which can fall upon its Rurban Centre for the sale of their products. It should also be kept in mind that the region is fairly traversed by good roads in which there is high frequency of buses. This will enable the people to reach any Rurban Centre within a period of one hour.

At the same time the villagers should reach the Rurban centre within 3 to 4 hours even on a bullock cart. As far as possible it must be located not more than 10 miles from a railway line and a good metalled road must pass through it. In Peninsular India where there is not such a net work of railway lines, the distance can be even 15 to 20 miles. But in South India roads are comparatively well developed. So every Rurban centre can be selected on metalled roads.

It has also a great influence on the area served by the particular Rurban centre and the supplies which it receives from the surrounding area. Such Rurban centres also form the communting town as the employees do not find residence in the main city and the power driven vehicles bring them quickly to their place of work.

The selection of a Rurban centre depends also upon the Regional city or town whose satellite it may form. If it is an industrial city then some of the future industries can be located in the satellites. After the selection of the Rurban centre as the market town, it has to be provided with various facilities. The chief among them are one or two Colleges in addition to Schools, maternity houses and hospitals, banks, post and telegraph offices.

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MEASUREMENT AND COMPARISON OF TECHNICAL CHANGE IN VARIOUS COUNTRIES*

THE pioneering work of Solow in measuring neutral technical change [5] and embodied technical change [6] is well known. Various difficulties exist in attempting to apply such techniques. Some of these arise in the estimation process, and others arise from the lack of suitable data. In this paper, a method has been devised to measure technical change in cases where national product data are available, but balance sheet data on the amount of plant in existence are not available. The method has been applied to the manufacturing sectors of seventeen developed and sixteen developing countries, so as to permit comparisons of growth rates of technology in the period 1950-1964.[1]

Economic Model and the Measurement of Technical Change:

Because this study is aggregative, I shall use properties of the macroeconomy to estimate the element of technical change. My purpose is to obtain data which permit the comparison of rates of technical change in countries at different levels of development. Most countries do not have information about the total amount of plant in existence at each date. They do, however, have data on investment (i.e. *changes* in plant). My problem, then, is to estimate technical change in cases where data on total plant are not available.

We postulate the supply side of a macroeconomy of the following conventional characteristics:

An aggregate production function

$$X = f(N, K) \tag{1}$$

The conditions for profit maximization are

* The author gratefully acknowledges helpful comments from Professors Edward Ames, Robert L. Basmann, and G. Edward Schuh on an earlier draft of this work.

[1] The method does not permit the comparison of the levels of technology in the manufacturing industries of different economies.

(2) $w^* = \frac{\partial X}{\partial N}$, or $N = n^d(w^*)$, where $w^* = \frac{w}{p}$

(3) $i^* = \frac{\partial X}{\partial K}$, or $K = k^d(i^*)$, where $i^* = \frac{i}{p}$

And the supply of labour and capital are given by

(4) $N = n^s(w^*)$

(5) $K = k^s(i^*)$

where X=quantity of output produced

N=quantity of labour employed

K=quantity of capital stock

w=wage reat

i=rate of interest

p=price index

$\frac{\partial X}{\partial N}$ = marginal product of labour

$\frac{\partial X}{\partial K}$ = marginal product of capital

In order to derive our measure of technical change, we use these postulates in a special way. We rewrite our production function (1), the labour demand function (2), and the capital demand function (3) as follows:

(1′) $X = Af(N, K)$

(2′) $w^* = \frac{\partial X}{\partial N} = A\frac{\partial f}{\partial N}$

(3′) $i^* = \frac{\partial X}{\partial K} = A\frac{\partial f}{\partial K}$

A is a multiplicative factor which represents a shift of the production function, i.e. technical change. Let every variable in the foregoing system be a function of time. Differentiating both sides of equation (1′) with respect to time (t), we obtain;

(6) $\frac{dX}{dt} = A\left(\frac{\partial f}{\partial N}\frac{dN}{dt} + \frac{\partial f}{\partial K}\frac{dK}{dt}\right) + f(N, K)\frac{dA}{dt}$

Because $\partial X/\partial N = A(\partial f/\partial N)$, $\partial X/\partial K = A(\partial f/\partial K)$, and $f(N, K) = \frac{X}{A}$, we write (6) as:

$$(7) \quad \frac{dX}{dt} = \frac{\partial X}{\partial N}\frac{dN}{dt} + \frac{\partial X}{\partial K}\frac{dK}{dt} + \frac{X}{A}\frac{dA}{dt}$$

Differentiating both sides of equation (4) with respect to t, we obtain:

$$(8) \quad \frac{dN}{dt} = \frac{dn^s(w^*)}{dw^*}\frac{dw^*}{dt}$$

Differentiating both sides of equation (5) with respect to t, we obtain:

$$(9) \quad \frac{dK}{dt} = \frac{dk^s(i^*)}{di^*}\frac{di^*}{dt}$$

Substituting (8) and (9) into (7), we get:

$$(10) \quad \frac{dX}{dt} = \frac{\partial X}{\partial N}\frac{dn^s(w^*)}{dw^*}\frac{dw^*}{dt} + \frac{\partial X}{\partial K}\frac{dk^s(i^*)}{di^*}\frac{di^*}{dt} + \frac{X}{A}\frac{dA}{dt}$$

Differentiating equation (2′) with respect to t,

$$(11) \quad \frac{dw^*}{dt} = \frac{\partial\left(\frac{\partial X}{\partial N}\right)}{\partial N}\frac{dN}{dt} + \frac{\partial\left(\frac{\partial X}{\partial N}\right)}{\partial k}\frac{dK}{dt} + \frac{1}{A}\frac{\partial X}{\partial N}\frac{dA}{dt}$$

Differentiating equation (3′) with respect to t,

$$(12) \quad \frac{di^*}{dt} = \frac{\partial\left(\frac{\partial X}{\partial K}\right)}{\partial N}\frac{dN}{dt} + \frac{\partial\left(\frac{\partial X}{\partial K}\right)}{\partial K}\frac{dK}{dt} + \frac{1}{A}\frac{\partial X}{\partial K}\frac{dA}{dt}$$

Substituting (8) and (9) into (11) we get:

$$(13) \quad \frac{dw^*}{dt} = -\frac{i^*}{A}\frac{dw^*}{di^*}\frac{dA}{dt}$$

Substituting (8) and (9) into (12) we get:

$$(14) \quad \frac{di^*}{dt} = -\frac{w^*}{A}\frac{di^*}{dw^*}\frac{dA}{dt}$$

Substituting (13) and (14) into (10), we get:

$$(15) \quad \frac{dA}{dt} = \frac{A\frac{dx}{dt}}{X - w^* i^* \left[\frac{dn^*(w^*)}{di^*} + \frac{dk^*(i^*)}{dw^*}\right]}$$

Because all variables in the foregoing system are functions of time (t), we can approximate the time-derivatives by year-to-year changes and get the discrete form as,

$$(16) \quad \triangle A(t) = \frac{A(t)\,\triangle X(t)}{X(t) - w^*(t)\,i^*(t)\left[\frac{\triangle N(t)}{\triangle i^*(t)} + \frac{\triangle K(t)}{\triangle w^*(t)}\right]}$$

Therefore, to obtain a time series showing annual *changes* in A(t), we need only obtain time series to be associated with various variables in (16). In particular we use the following data, which have turned out to be rather readily obtainable for many countries:

X(t)=quantity of industrial production at year t

N(t)=quantity of industrial labour employed at year t

$\triangle$K(t)=quantity of industrial capital formation at year t

$w^*(t)$=real wage rate at year t

$i^*(t)$=real rate of interest at year t

At time t=0, we set A(0)=1, then at time t=1, 2, 3, ..., A(1), A(2), A(3), ... etc. may be calculated successively. Like all the literature on the measurement of technical change, the methodology we have used does not apply statistical significance tests.

The Sample Selection and the Data:

The procedure of calculation based on the economic model presented in the previous section is to calculate time series for A (the measure of technical change) from (16) in the manufacturing industry of each country at different levels of development. In order to carry out this step, we need a sample of countries and manufacturing industry statistical data required for the calculation.

In order to assure the generality of any findings and conclusions from the empirical study, a sample selected in a random way would

be the best. However, my purpose is to obtain data which permit the comparison of countries at different levels of development. Unfortunately, many countries do not have data which I need as economic variables for a longer period of time. They do have them only for a short period of time, especially in underdeveloped countries. If I use these data in my empirical study, a small number of observations means that the problem of small samples is serious. To suit the special purpose of this study, all countries having the data needed to make my computations were used. No particular size of country or type of country would be purposely included or excluded. The final sample of 33 countries for which the data were available is given in the Appendix.

The conceptually cleanest measure of output would be net product. But net product series are hard to come by in some countries, so I have used gross product instead. Thus my X is a time series of manufacturing gross product.

Since manufacturing working hours are different from country to country, man-hours of production workers data is a better proxy for labour input. But many countries do not have this data. Employment data is used as a proxy for labour input.

Many countries do have data on investment in their national product data. Gross changes in manufacturing machinery and other equipments is used as a proxy for the manufacturing capital formation.

The real wage rate is obtained by annual average manufacturing wage rate per hour deflated by the wholesale price index (finished goods or general). And the real interest rate is obtained by government bond yield or discount rate deflated by the wholesale price index. The sources of data are also given in the Appendix. Standard sources are used throughout.

The Empirical Test of the Time Path of Technology:

Theoretical analysis of economic model led to the derivation of the fundamental iterative formula (16). We set $\Delta X(t)=X(t+1)-X(t)$ (the same for other variables), and at time $t=1950$, we set $A(1950)=1$ arbitrarily, then at time $t=1951, 1952, 1953, \ldots$, $A(1951)$, $A(1952)$,

A(1953), ..., etc. are calculated successively.[2] The time path of technology for each country for the even year is shown in Table 1.

TABLE 1

The Time Path of Technology (1950 = 1·00)

Country	1952	1954	1956	1958	1960	1962	1964
Argentina	0·968	1·028	1·201	1·369	1·387	1·479	1·496
Australia	1·127	1·285	1·357	1·553	1·673	1·655	1·769
Austria	1·167	1·162	1·440	1·525	1·678	1·724	1·956
Belgium	0·916	1·180	1·229	1·363	1·495	1·666	1·782
Brazil	0·952	1·207	1·332	1·432	1·645	1·811	1·887
Burma	1·143	1·334	1·421	1·556	1·641	1·799	1·847
Canandar	1·138	1·256	1·529	1·526	1·618	1·839	2·120
Ceylon	1·140	1·206	1·245	1·293	1·356	1·427	1·582
Chile	1·081	1·221	1·378	1·507	1·477	1·581	1·645
China (Taiwan)	1·179	1·316	1·438	1·593	1·707	1·868	2·054
Colombia	1·195	1·368	1·453	1·614	1·738	1·897	1·985
Denmark	0·893	1·169	1·205	1·439	1·644	1·855	1·921
France	1·142	1·347	1·678	1·953	2·028	2·187	2·253
Germany	1·116	1·370	1·704	1·974	2·184	2·238	2·237
Greece	0·939	1·187	1·297	1·432	1·551	1·623	1·810
India	1·096	1·217	1·361	1·519	1·627	1·715	1·974
Ireland	0·958	1·167	1·238	1·477	1·602	1·843	1·901
Italy	1·067	1·179	1·495	1·674	2·036	2·103	2·191
Japan	1·248	1·421	1·755	1·976	2·210	2·358	2·497
Netherlands	1·057	1·334	1·553	1·664	1·818	1·996	2·109
New Zealand	1·162	1·179	1·285	1·491	1·627	1·721	1·888
Norway	1·182	1·297	1·316	1·517	1·686	1·783	1·881
Pakistan	1·091	1·143	1·369	1·471	1·586	1·780	1·898
Philippines	1·194	1·353	1·476	1·548	1·702	1·831	1·966
Portugal	1·016	1·007	1·040	1·203	1·524	1·566	1·595
S. Rhodesia	1·115	1·160	1·330	1·403	1·545	1·615	1·679
Spain	1·058	1·143	1·188	1·284	1·389	1·521	1·545
Sweden	1·067	1·138	1·243	1·407	1·692	1·758	1·915
Switzerland	1·132	1·228	1·421	1·683	1·743	1·811	1·918
Turkey	1·128	1·253	1·407	1·476	1·521	1·671	1·779
U. Kingdom	1·123	1·357	1·536	1·605	1·749	1·869	2·009
U. of S. Africa	1·009	1·098	1·230	1·325	1·545	1·667	1·752
U.S.A.	1·2032	1·2754	1·5289	1·4631	1·7249	1·8958	2·1802

[2] The actual computation of the time series of technical change was done with the aid of the computer sciences division at Georgia State University on the IBM 7094 computer.

The economic model and estimation technique of technical change we have constructed and presented is a method of interpreting numerical observations. In the light of the evidence, it is necessary to have a rule enabling one to accept or reject this formula. One can assert himself that if the theory we have developed is sound, then first, the index of technology, A_t, should always be a positive number; and second, A_{+1} in general should be greater than or equal to A_t.

As it happens, this standard of judgment is sufficient to enable us to accept this fundamental iterative formula. As Table 1 shows, for the results of the sample of 33 countries, the time series of A_t appear to be theoretically acceptable. Not only do all number of A_t's appear positive values, but the entire series for A_t in most countries shows a gradual, steady increase. In some cases, the time series of technology show small individual year-to-year decreases but the entire series of A_t in almost all countries is not subject to violent increases and decreases.

TABLE 2

Frequency Distributions of Technology in 1964 (1950 = 1·00)

Level of Technology	*Developing Country*	*Developed Country*
1·40—1·50	Argentina	
1·50—1·60	Ceylon, Portugual, Spain.	
1·60—1·70	Chile, S. Rhodesia	
1·70—1·80	Turkey, S. Africa	Australia, Belgium*
1·80—1·90	Brazil, Burma, Greece, Pakistan	Zew Zealand, Norway**
1·90—2·00	Colombia, India, Philippines	Austria**, Denmark**, Ireland, Sweden**, Switzerland**
2·00—2·10	China (Taiwan)	U. Kingdom**
2·10—2·20		Canada, Italy* Netherlands*, U.S.A.
2·20—2·30		France*
2·30—2·40		Germany*
2·40—2·50		Japan

*European Economic Community Country.

**European Free Trade Association Country.

Generally speaking in the so-called "developed" countries the growth rate of technology in the manufacturing industry for the period 1950-1964 is higher than that of the so-called "underdevelop-

ed" countries.[3] As Table 2 shows, in the underdeveloped countries, the change rate of technology falls between 1.40 and 2.10. In the case of developed countries' group, the distribution of the growth rates of technology is more scattered than that of underdeveloped countries. When we use the Kolmogorov-Smirnov two sample test [4], these two independent samples show significant difference in distribution at the .05 level.

Another interesting finding is noted when the developed countries are divided into three smaller groups. The first group contains the countries belonging to European Economic Community, the second group the countries belonging to European Free Trade Association, and the third group is the remaining developed countries. The result we find is that the growth rate of technology of the countries in the European Economic Community (Belgium is an exception) is higher than the growth rate of technology of the countries belonging to the European Free Trade Association. And the change rate of technology of the countries of European Free Trade Association is compact at the range between 1.80 to 2.10. In the countries not belonging to these two groups, the distributions of their technical change are very irregular.

According to various past studies, tcehnical change has accounted for more than two-thirds of the total output growth in the past hundred years or so [1, 2, 3, 5]. I therefore calculated the proportion of the increase in manufactured output attributable to technical change and total manufactured output in countries at different levels of development, so as to see whether this ratio is higher in the developed countries than in the underdeveloped countries. The ratio of each country is shown in Table 3, and a tabulation is given in Table 4.

As Table 4 shows, the ratio between the output attributable to technical change and total output during 1950-1964 appears higher in developed countries than in developing countries. When we apply the Kolmogorov-Smirnov two sample test to test the difference bet-

[3] It is very difficult to define a country basis on the level of development. In this study I try to divide the country basis on the national income per capita at the year of 1965. We say a country is developed if its national income per capita in United States dollars is over 750. Japan is an exception, because it is one of the strongest industrial power countries.

ween these two independent samples, the difference turns out to be significant at the .01 level.

A comparison of rates of growth of technology with rates of growth of output in manufacturing suggests that the stand of many economists, that improved technology and increased output tend to be associated, is quite plausible.

TABLE 3

The Ratio between the Increase in Manufactured Output Attributable to Technical Change and the Increase in Total Manufactured Output During 1950-1964

Country	Ratio
Argentina	0.818
Australia	0.743
Austria	0.833
Belgium	0.846
Brazil	0.844
Burma	0.648
Canada	0.881
Ceylon	0.799
Chile	0.821
China (Taiwan)	0.683
Colombia	0.726
Denmark	0.889
France	0.843
Germany	0.871
Greece	0.643
India	0.736
Ireland	0.748
Italy	0.834
Japan	0.838
Nethernands	0.866
New Zealand	0.789
Norway	0.879
Pakistan	0.667
Philippines	0.645
Portugal	0.647

Country	Ratio
S. Rhodesia	0.636
Spain	0.631
Sweden	0.832
Switzerland	0.839
Turkey	0.625
U. Kingdom	0.833
U. of S. Africa	0.714
U.S.A.	0.903

TABLE 4

Frequency distributions of the ratio between the Manufactured Output Attributable to Technical Change and Total Manufactured Output during 1950 1964.

Ratio	*Developing Country*	*Developed Country*
0·600—0·625		
0·625—0·650	Burma, Greece, Phillippines, Portugal, S. Rhodesia, Spain, Turkey.	
0·650—0·675	Pakistan	
0·675—0·700	China (Taiwan)	
0·700—0·725	S. Africa.	
0·725—0·750	Colombia, India.	Australia, Ireland
0·750—0·775		
0·775—0·800	Ceylon	New Zealand.
0·800—0·825	Argentina, Chile.	
0·825—0·850	Brazil	Austria, Belgium, France, Italy, Japan, Sweden, Switzerland, U.K.
0·850—0·875		Germany, Netherlands
0·875—0·900		Canada, Denmark, Norway
0·900—0·925		U.S.A.

APPENDIX

TABLE 5

List of Countries covered in the Sample

Country	Per Capita National Income (3) (in United States Dollars, 1965)
Argentina	740
Australia	1,620
Austria	970
Belgium	1,406
Brazil	217
Burma	56 (1)
Canada	1,825
Ceylon	131
Chile	515
China (Taiwan)	185
Colombia	237
Denmark	1,652
France	1,436
Germany, Federal Republic of	1,447
Greece	566
India	86
Ireland	783
Italy	888
Japan	696
Netherlands	1,265

Country ...	Per Capita National Income (3) (in United States Dollars, 1965)
New Zealand	1,706
Norway	1,453
Pakistan	89 (1)
Philippines	219
Portugal	315
South Rhodesia	206
Spain	594
Sweden	2,201 (2)
Switzerland	1,928
Turkey	244
United Kingdom	1,451
Union of South Africa	509
United States of America	2,894

(1) Per capita national income of 1964.
(2) Per capita gross domestic product at factor cost.
(3) Resources: National Income Statistics, United National, 1966.

The Collection of the Statistical Data:

The sources of statistical data used in this study are listed in Table 5. Most of the data are from publications of the Statistical Office, United Nations, New York, and other international organizations. Because these organizations are constantly revising many of their series, we tried to collect our data from sources that were consistent in their definitions.

The sources of statistical data need to be defined.

A: *Monthly Bulletin of Statistics*, Statistical Office, U.N., N.Y.

B: *Statistical Papers Series H*, Nos. 1-10, Statistical Office, U.N., N.Y.

C: *Statistical Yearbook*, 1949-1966, Statistical Office, U.N., N.Y.

D: *Yearbook of National Account Statistics*, 1957-1966, Statistical Office, U.N.

E: *International Financial Statistics*, International Monetary Fund, Washington, D.C.

F: *Yearbook of Labour Statistics*, 1959-1965, International Labour Organization, Geneva.

G: *International Labour Review*, 1959-1967, International Labour Organization, Geneva.

H: *Consumer Prices Indices*, Nov. 1966, Feb. & Aug. 1967, Feb., 1968, Organization for Economic Cooperation and Development, Paris.

I: *General Statistics*, 1962, 1963, 1964, 1965, Organization for Economic Cooperation and Development, Paris.

J: *Main Economic Indicators*, 1962-1967, Organization for Economic Cooperation and Development, Paris.

K: *Statistical Bulletins, Industrial Statistics*, 1900-1962, Organization for Economic Cooperation and Development, Paris.

L: *General Statistics*, OEEC Statistical Bulletins, 1952-1961, Organization for European Economic Cooperation, Paris.

M: *Statistical Bulletin for Latin America*, Vol. 1-3, Economic Commission for Latin America, U.N.

N: *Economic Bulletin for Africa*, Economic Commission for Africa , U.N.

O: *Economic Survey of Asia and the Far East*, Economic Commission for Asia and the Far East, U.N.

P: *Economic Bulletin for Latin America*, Economic Commission for Latin America, U.N.

TABLE 6

Sources of Data Used in Preparation of Table 1

Country	*Quantity of Output Produced*	*Quantity of Labor Employed*	*Price Index*	*Wage Rate*	*Quantity of Capital Formation*	*Rate of Interest*
Argentina	A,D,M,	A,F,M,	A,C,M,	A,M,	A,B,D,M.	E,M,
Australia	A,B,D,	A,C,F,	A,C,	A,C,	B,D,	E,C
Austria	A,I,J,K,	F,I,J,	A,I,J,	A,I,J,	B,D,	E,I,J,
Belgium	A,I,J,K,	F,I,J,	A,I,J,	A,I,J,	B,D,	E,I,J,
Brazil	A,C,M,	A,F,M,	C,E,M,	E,M,	B,D,P,	E,M,
Burma	A,C,O,	A,C,F,	A,E,O,	A,E,	B,D,O,	E,O
Canada	A,I,J.	C,F,I,	A,H,J,	A,E,I,	B,D,E,	E,I,J,
Ceylon	A,C,O	A,F,O	A,E	E,O	B,D,O	E,O
Chile	A,C,M	C,F,M	C,E,M	A,E,M	B,D,M	A,E,M
China (Taiwan)	A,C,O	C,F,O	E,O	E,O	D,O	A,E,O
Colombia	C,D,M	A,F,M	A,M	C,M	B,D,M	E,M
Denmark	I,J,K	F,J,K	C,I,J	C,I,J	B,D	F,I,J
France	A,C,I	A,F,J	H,I,J	A,E,J,	B,D,E	E
Germany	A,J,L	F,IL	C,H,J	C,I,J	B,D,E	E
Greece	C,I,J	C,F,J	C,J	C,J	B,D,E	E
India	C,O,G	A,F,O	C,O	A,E,	P,D,O	E
Ireland	A,C,I	F,I,L,	A,I,J	A,E,J	B,D	E
Italy	A,J,K	A,F,J	C,H,J	C,E,J	B,D	E,I,J
Japan	A,C,J	F,O	C,H	C,E,J	B,D,O	E,J
Netherlands	A,I,J	F, J	C,H,	A,J,L	B,D	E,J
New Zealand	A,C,O	C,F,O	A,C	A,C	B,D	E
Norway	A,C,J	A,F,J	C,I,J	C,I,J	B,D,	E,I
Pakistan	A,C,O	A,F,O	A,E,	A,E,	B,D	E,O
Philippines	A,C,O	F,O	A,E,O	A,E,	B,D,O	E
Portugal	A,I,J	F,J,C	C,J	A,E,J	B,D	E,J
S. Rhodesia	A,C,N	A,C,F	A,C	A,C	B,D,E	E, N
Spain	A,C,I	A,F,J	C,J	C,J,	B,D	E,J
Sweden	A,I,J	F,J	A,I	C,I,J	B,D	E,I
Switzerland	A,C,J	F,J	A,J	A,E,J	B,D	E
Turkey	A,J,K	C,F,J	A,I,J	C,I,J	B,D	E
U. Kingdom	A,C,I	A,F,J	H,J	A,E,	B,D,E	E
U. of S. Africa	A,C,N	A,C,F	A,C	A,C	B,D,E	E,N
U.S.A.	A,C,J	A,F,J	C,I,J	A,C	B,D,E	E,J

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DISGUISED UNEMPLOYMENT AND ECONOMIC GROWTH—A DIAGRAMMATIC REPRESENTATION*

"To Keynes, the waste of economic resources through unemployment seemed nonsensical and suicidal. He concentrated more of his energies on the solution of this problem than any other; and he had considerable success".

Seymour E. Harris, *The New Economics*,
(New York: Alfred A. Knopf, 1947), p. 403.

The existence of economic surplus is one of the necessary prerequisites for capital formation and economic development. In overpopulated under-developed countries, the potential economic surpluses are quite large but remain unexploited. As Professor Albert O. Hirschman has pointed out, "Development depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes, resources and abilities that are hidden, scattered, or badly utilized. In this category are the disguised-unemployed human resources. Quantities of such idle and poorly utilized labour resources are probably large in underdeveloped countries especially in densely populated areas".[1] People are the major resource in most of the underdeveloped countries. They also represent the only resource that is generally in excess over requirements. Mobilization of peoples' energies for active participation in economic, social and cultural progress is therefore potentially one of the most productive methods of achieving such success.

This paper exclusively deals with the disguised unemployed manpower resources in the over-stocked rural regions of the underdeveloped countries. The main questions we are going to examine in this paper are: (1) What is the nature of the disguised unemployment? (2) How does this surplus manpower originate? (3) How to utilize these disguised-unemployed manpower resources for promoting economic growth? Further, an entirely new diagrammatic representation is made to show how best these disguised unemployed

* The author is grateful to Professors Clark Allen and Bernard Marks for their invaluable coaching of the application of A, B, C, D of Mathematics to economic problems while he was at Southern Illinois University. But no one else, except the author, is responsible for any errors in this paper. All the sources of information utilised in this paper have been gratefully acknowledged in the foot-notes and the bibliography.

[1] Hirschman, A. O., **The Strategy of Economic Development**, (New Haven: Yale University Press, 1958), p. 5.

manpower resources could be utilised for developmental purposes which would otherwise be going to waste for ever. This paper is based mainly on the theories of Ragnar Nurkse and W. A. Lewis. The paper assumes that the reader has a good knowledge of the theories of Nurkse and Lewis. Simple mathematics is used as a tool to serve the purpose of this paper.

By far, one of the most serious problems in underdeveloped countries is one of disguised unemployment. The problem has become more acute mainly because of the excessive pressure of population on land and also owing to the lack of alternative occupations. In the next few paragraphs, we shall look for a theoretical explanation of the simultaneous existence of surplus labour in agriculture and of labour receiving a positive wage even in those cases where its marginal productivity is zero. The term disguised unemployment is not applied to wage labour (such as factory worker) for the employer presumably would not employ a labourer unless his labour increases the total output. It represents a condition of family-farm employment in peasant economies. If we take the size of the labour force as given, disguised unemployment may be defined as a situation in which the withdrawal of a certain quantity of the factor labour to the alternative uses will not reduce the total output of the sector from which it is withdrawn. This is as much to say that the marginal productivity of labour in their original employment, over a wide range, is zero or close to it if not negative. This means that with the unchanged techniques of production, and without any significant reorganization, a part of the labour engaged in agriculture can be withdrawn without causing any reduction in total output. We shall elaborate this point further with the help of Diagram I.

With a given plot of land and with given techniques of production, let us assume, 80 units of output can be produced by five members of a farm family. Let us also assume that there are eight persons in the family to work on the farm. By addition of three more members on this land, the family will not be able to increase the total output on the farm. In other words, the marginal productivity of the 6th, 7th and 8th unit of labour is zero. But they share the total product produced by the productive members of the family.

Total Product = 80 units

Average Product without adding disguised unemployed

$$= \frac{\text{Total Product}}{\text{Number of units of labour}} = \frac{80}{5} = 16 \text{ units}$$

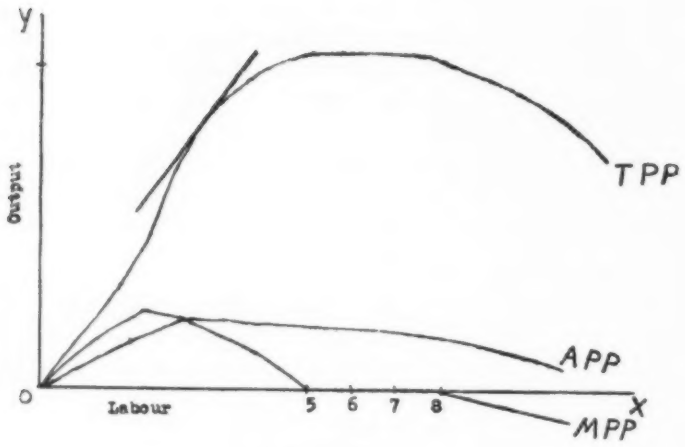


Diagram 1

TPP=Total Physical Product Curve
APP=Average Physical Product Curve
MPP=Marginal Physical Productive Curve

AP after adding disguised unemployed:

$$\frac{\text{Total Product}}{\text{Number of units of labour}} = \frac{80}{8} = 10 \text{ units}$$

Professor Ragnar Nurkse has called this productive members' saving for supporting the unproductive members in the family as the 'saving potential' of the agricultural sector.[2] Professor Arthur Lewis' main contribution to the concept of disguised unemployment is his explanation of the existence of a greater than zero wage when the marginal product of labour is zero.[3] Quantitative measurement of this disguised unemployment is difficult, and authorities differ in their estimates of its extent, but these authorities are unanimous in observing that an enormous amount of manpower is not now fully utilized. It is quite interesting to note here that a report of the United Nations

[2] Nurkse, Ragnar, **Problems of Capital Formation in Underdeveloped Countries,** (New York: Oxford University Press, 1964), pp. 36-39.

[3] Lewis, W. A., "Economic Development with unlimited Supplies of Labour" in **Readings in Economic Development,** edited by Morgan, T. and others, (Belmont: Wordworth Publishing Co., 1963), pp. 214-31.

has stated that for many regions of India, Pakistan, part of the Philippines and Indonesia, the surplus farm labour is between 20 per cent and 25 per cent.[4] According to Professor Nurkse, disguised unemployment is typical of many countries in the area ranging from Southeastern Europe to Southeastern Asia. In these over-stocked agricultural economies it is truly a mass phenomenon, due to social, economic and demographic causes. There are no alternative employment opportunities ; two-thirds to four-fifths of the total labour force work on the land, and of this farm population, according to various estimates in different countries, 15 per cent, 20 per cent or as much as 30 per cent constitutes disguised unemployment.[5] Further in a study made by the Royal Institute of International Affairs of the situation in Eastern Europe and Southestern Europe, the lowest estimate of surplus agricultural population was placed at 20 to 30 per cent of these countries.[6] The extent of disguised unemployment was estimated as high as 20 to 30 per cent in Syria.[7] The highest estimates are for Egypt which place surplus at 40 to 50 per cent of the farm population.[8]

Whatever may be the statistical accuracy on the extent of the disguised unemployment, it is quite clear that there exists surplus agricultural population in many of the underdeveloped countries. Then the next question is why not make use of these disguised unemployed manpower resources or the 'saving potential' of the subsistence sector for productive purposes elsewhere. This idea came first in the mind of Professor Nurkse long back. In his own words: " there is the possibility, however, of taking surplus people away from land ; any thing they could produce elsewhere could be a clear addition to the real national income. But what can they produce without capital ? Very little. Then why not let them work producing real capital ? Here we get the glimpse of what disguised unemployment can mean for capital formation. Even if the direct marginal yield of labour is zero, the indirect yield of labour when applied to round-about methods of production ... that is, to the accumulation

[4] U.N.O., **Measures for the Economic Development of Underdeveloped Countries,** (New York, 1951).

[5] Nurkse, **op. cit.,** pp. 34-35.

[6] See U.N.O., Report, **op. cit.,** pp. 8-9.

[7] Pepelasis, A., **Economic Development,** (New York : Harpen Brothers, 1961), p. 80.

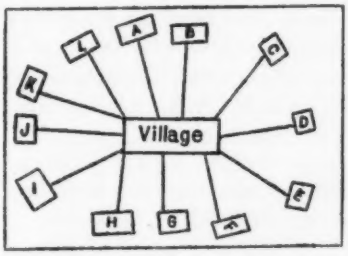
[8] Khan, N. A., **Problems of Growth in an Underdeveloped Economy,** (Bombay : Asia Publishing House, 1961), p. 159.

of capital ... is likely to be very high in countries where capital is scarce ".[9]

However, we cannot and should not move these disguised unemployed persons from the land and send them to the cities and other urban areas to work, at least in the initial stages of development. This is mainly because of several obstacles. In the first place, the disguised unemployed persons of peasant families have a peculiar attachment to rural life and, therefore, should not be dragged to urban factories. Secondly, these workers are unskilled and it is difficult to employ them in the organised sector. Thirdly, there is another important hindrance ; i.e. the shortage of capital and other co-operative resources. Instead, therefore, they should be drawn off the land and put to work on simple community development projects in the rural areas. In other words, this problem should be approached through launching of intensive rural public works programmes which require little or no capital equipment. There is plenty of work to be done in the rural areas in the spheres of improving sanitation, public health, building roads, culverts, community halls, school buildings, minor irrigation works, rural electrification, drinking water supply, afforestation, and many other kinds of work. Therefore, it is possible to utilize the surplus labour force in the rural areas on these community development projects. The consumption needs of these disguised unemployed workers who would work on these various projects have to be met by means of a process of effective mobilization of the 'saving potential' of their productive members of the family. In other words, the consumption of the remaining productive members must be kept at its former level ; i.e. they must still supply the surplus, which they did not formerly consume, to workers who have been withdrawn from land. Some economists including Professor Nurkse have fears about the possible leakage in making available the surplus of consumption goods to the disguised unemployed workers who are now put into work on various development projects, from productive members of the family. The leakages, they are afraid are the demonstration effect, increase in the marginal propensity to consume, and cost of transporting food to these project areas, etc. But if we launch the development projects around the village as shown in diagram 2, all these leakages can be avoided, since there is plenty of work do in a particular locality. The task of execution of these projects in a particular locality and organizing the surplus labour to work on these projects should be entrusted to the local authorities.

[9] Nurkse, Ragnar, **op. cit.**, p. 36.

Diagram 2
Community Development Projects



A, B, C, D, E, F, G, H, I, J, K, L—represent different community projects that can be undertaken by utilizing the disguised unemployed human resources in the subsistence sector. These projects should be located around the village, i.e. within the rural sector.

The removal of rural surplus labour and their inclusion in productive work is, of course, simply the familiar point of achieving a more efficient allocation of a given supply of resources, i.e. moving towards the maximum production frontier. Thus, in this way, there can be an increase in investment goods (capital formation) without additional cost (or with very little cost). Otherwise the governments in these underdeveloped countries will have to spend large sums of money out of public budgets on these works. If such works are done in the rural areas by mobilizing these surplus labour, the government may invest this amount of saving elsewhere. And this is a clear net addition to the real national product. In the succeeding stages of development, i.e. as the development proceeds at an accelerated rate, we can gradually remove these workers to industrial and other organised sectors. This possible avenue of accumulating capital by utilizing the disguised unemployed workers has had been given very little attention by the development planners. Further, such efforts are also valuable because they stimulate the community spirit in the country side, ... they encourage villagers to feel that they can help themselves—a sentiment which may yield dividends in many ways. Thus, effective mobilization and utilization of the surplus abundant human resources would certainly contribute to the acceleration of economic growth in the less developed countries.

We shall now turn our attention to illustrate diagramatically what we have discussed so far. For this purpose, we have used the

production possibility or transformation curves and also the community indifference curves.

Let us assume with a given state of technology and resources, that MSR^1 in Diagram 3 represents the production possibility curve of these underdeveloped countries. For the sake of simplicity let us call it R^1. Let us also assume that R^1 includes all resources except disguised unemployed workers. This curve is also called the opportunity boundary line or transformation curve. Further, the production possibility curve or frontier depicts society's menu of choices. The production possibility schedule can help make clear the four basis problems of economic life : (1) what to produce, (2) how to produce, (3) for whom to produce, and (4) to see whether all the available resources are fully utilized. In our Diagram 3, X—axis measures the community development projects etc., which can be undertaken by using more labour intensive methods. Y-axis measures all other investment projects which require highly skilled labour, more capital, etc. Any point on this production possibility curve represents the possible or attainable combinations of projects X and Y that the underdeveloped countries can have with the given amount of resources R^1. This point is also called the full-employment and full-production point.

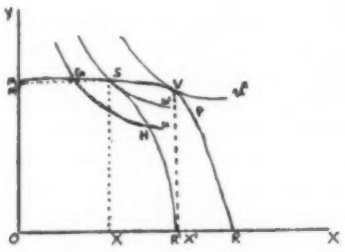


Diagram 3
Community Development Projects

MSR′=Production Possibility Curve which includes all resources except the disguised unemployed workers.

MVR=Production Possibility Curve which includes all resources.

U, U′, U″=Community Indifference Curves.

The indifference curve indicates the ordering of various conceivable combinations of projects X and Y according to some scale of 'better or worse', 'up or down'. Thus, a complete description of underdeveloped countries' tastes for two kinds of projects is pro-

vided by the community indifference map which corresponds to an entire system of indifference schedule. In Diagram 3, we have shown only three indifference curves for the sake of convenience. In fact, the indifference map consists of an infinite number of indifference curves. The shape of these indifference curves is determined by the tastes, preferences, the subjective evaluation of these underdeveloped countries between projects X and Y.

Optimal Combinations of Projects X and Y

The theory of optimal choice needs putting together two sets of relationships, one which describes what there is to choose among, and the other which enables us to select out of the possible choices that which stands highest on some scale of value or preference. In Diagram 3, U, U′, U″ represent the taste factors or indifference curves of these underdeveloped countries in question. We have called them community indifference curves. The community indifference curves show what the underdeveloped countries would like to do. The production possibility curve R′ shows what these countries are able to do. The problem is now which is the optimal position or preferred position or optimal combination of projects X and Y. The answer to this problem is the point S in Diagram 3. At point S, the community indifference curve U′ is tangent to the production possibility curve R′. In other words, at point S, the slope of the production possibility curve is equal to the slope of the community indifference curve U′. Has this equality of slopes any economic meaning? Yes, it has. The slope of the community indifference curve is $\frac{dy}{dx}$, which means a change in Y (investment projects) divided by a change in X (community projects). This is the marginal rate of substitution—MRS.

The slope of the community indifference curve is also equal to the ratio of the marginal utilities of projects X and Y.

$$\text{MRS} = \frac{dy}{dx} = \frac{\text{MU}_x}{\text{MU}_y}$$

The slope of the production possibility curve is:

$$\frac{\text{MPP}_x}{\text{MPP}_y} = \frac{\text{Marginal Physical Product of X}}{\text{Marginal Physical Product of Y}}$$

$$\text{MRS} = \frac{dy}{dx} = \frac{\text{MU}_x}{\text{MU}_y} = \frac{\text{MPP}_x}{\text{MPP}_y}$$

Any point left of the point S represents a lesser satisfaction. Similarly, any point below S on R′ will also yield lesser satisfaction. In Diagram 3, both G and H fall on a lower indifference curve U.

Thus at S, the underdeveloped countries have OM′ of investment projects plus OX of community development projects. S represents the optimal combination of X and Y.

Now let us introduce disguised unemployed workers into our model. Now MVR represents the production possibility curve for these underdeveloped countries. Let us call this curve for the sake of simplicity R. R includes all resources in the economy including the disguised unemployed workers. Since these workers cannot be put into work on the investment projects because these projects need high skill and more capital, we have to employ them on the community development projects where their marginal productivity is greater than zero. The underdeveloped countries want to extend the community development projects by utilizing these surplus labourers and at the same time without any reduction in the investment projects. In other words, there is no change in the preferences or tastes of these countries between X and Y. In short, the ratio of the marginal utilities of X and Y will remain the same even at the new level. That is, even after moving from S to V, there is no change in preferences. That is why the new indifference curve U″ is tangent to R at V and is parallel to U′. The countries will be at an optimum point at V. Any movement from V in either direction will yield lesser satisfaction. If the underdeveloped countries move to the point P, these countries have to give up some investment projects. Since there is no change in the preferences of these countries between X and Y, they will stay at V. This represents the optimal combination of X and Y.

Thus, by Utilizing the disguised unemployed workers, these countries have extended the community development projects from X to X′ without reducing the number of investment projects. Therefore, the community has moved to a higher indifference curve U″ and the society is better off than it was before. Point V shows the optimal combination of X and Y. At this point, the slope of the community indifference curve U″ is equal to the slope of the production possibility curve R, that is,

$$\frac{MU_x}{MU_y} \text{ (new position at V)} = \frac{MU_x}{MU_y} \text{ (old position at S)} = \frac{MPP_x}{MPP_y}$$

Now we can summarize the gain we have achieved by utilizing the disguised unemployed workers in the rural areas as follows:

With R′, the underdeveloped countries were able to have only OM′ of Y and OX of X (projects).

Now after utilizing the disguised unemployed workers, i.e. with R, they can have OM′ of Y and OX+XX′ of X. Thus, OM′+OX′>OM′+OX.

From the foregoing discussion we can conclude that the underdeveloped countries can be better off by utilizing the surplus rural labour force and accelerate the rate of economic growth. However, it is not suggested that the disguised unemployed workers can pull the whole load of development process by themselves. What we have suggested is the effective mobilization and utilization of the available resources. The development planners should give serious attention to this neglected but important aspect, while framing the developmental scheme in these underdeveloped countries.

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INTERNATIONAL DISTRIBUTION OF INCOME—1961-1968

Introduction

THE United Nations termed the sixties the "Decade of Development". We are interested in discovering how the intention to narrow the gap between high and low income countries has, in fact, affected the incomes of poor countries and their share of world income.

Sources of Data

The various measures of income distribution and its changes between 1961 and 1968 were derived from World Bank estimates of population, GNP, and per capita GNP figures for the years 1961 and 1968. The figures for 1961 were taken from an unpublished study by the Comparative Data Division of the Economics Department, International Bank for Reconstruction and Development. The figures for 1968 were taken from the *World Bank Atlas*, 1968. Data for both years include the 122 countries that had populations of 1 million or more in 1968. The 1968 per capita GNP entries are rounded to the nearest ten dollars while the 1961 per capita GNP figures are not. The GNP (total and per capita) figures for 1961 are given in 1964 U.S. dollars while the 1968 GNP data are expressed in 1968 U.S. dollars.

Measures of Income Inequality

Quintile distributions of income have been computed for 1961 and 1968. The 122 countries were ranked according to per capita income (from poorest to richest) divided into 5 groups, each containing 20 per cent of the sample population, and income percentages were computed for each quintile.

Table 1

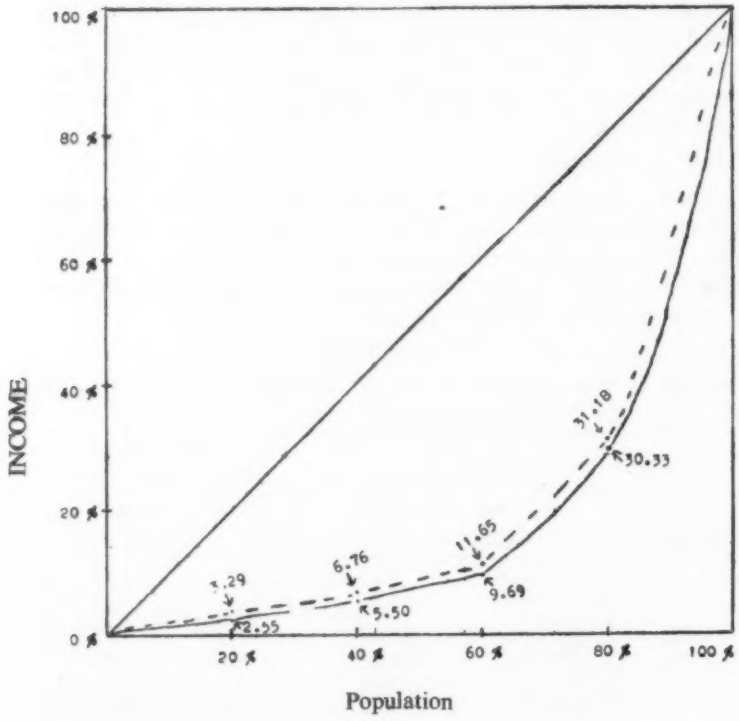
Percentage of World Income going to each quintile of the World's Population 1961-1968

	1961		1968	
Quintiles	% World GNP	Cum% World GNP	% World GNP	Cum% World GNP
Poorest 20%	3.29	3.29	2.55	2.55
Second 20%	3.47	6.76	2.95	5.50
Third 20%	4.89	11.65	4.19	9.69
Fourth 20%	19.53	31.18	20.64	30.33
Richest 20%	68.49	100.00	69.68	100.00

Between 1961 and 1968, the share of the poorest three quintiles declined, while the richest two quintiles each experienced a rise in their share of world income. None of these changes is so large as to indicate a substantial shift in the distribution of world income; however, it can be said that this measurement does not indicate a narrowing of the gap between 1961 and 1968. If anything, it suggestes a trend towards more unequal distribution of income, since the shares of the poorest three quintiles declined.

Schedule

1968		1961	
Cumulative Population %	Cum % Income	Cumulative Pop.%	Cumulative % Income
20	2.55	20	3.29
40	5.50	40	6.76
60	9.69	60	11.65
80	30.33	80	31.18
100	100.00	100	100.00



Lorenz curves have been plotted to express the figures graphically. Cumulative population and income percentages of the five groups are plotted on the abcissa and ordinate respectively. A diagonal from S.W. to N.E. indicates equal distribution of world income among the five groups. The amount of deviation of the curve from the diagonal indicates the extent of income inequality in the sample. The curves show that in 1968 there was greater income inequality than in 1961.

Table 2

Concentration Ratios—International Distribution of Income 1961-1968

Year	Concentration Ratio
1961	.5876
1968	.6017

An alternative to the graphic approach of the Lorenz curve is the concentration ratio. This ratio as seen in Table 2 represents the comparison of the area between the curve and the diagonal with the total area under the diagonal. A concentration ratio of zero indicates complete income equality, while a ratio of one expresses perfect inequality. It can be seen from Table 2 that international income inequality increased slightly between 1961 and 1968.

Table 3

Mean and Median World Per Capita Incomes, 1961 and 1968

Year	Mean Per Capita Income	Median Per Capita Income
1961	471*	92*
1968	661**	100**
Percentage Increase	45%	9%

* U.S., $ 1964.
** U.S., $ 1968.

Mean and Median per capita incomes for 1961 and 1968 are shown in Table 3. The figures show that the mean and median per capita incomes increased between 1961 and 1968. The mean income, however, is considerably greater than the median income for each year, indicating an extremely top-heavy distribution of income. Secondly, we notice that the mean income has increased 45% over the

base year (1961) while the median income in 1968 is only 9% greater than that of the base year.

Table 4

Growth Rate of World Income by each quintile 1961-1968

Population	1961 GNP in Millions U.S. 1964 $	1968 GNP in Million U.S. $	Index 1961=100
Poorest 20%	47,121	58,619	124.40
Second 20%	49,774	67,732	136.07
Third 20%	70,056	96,038	137.08
Fourth 20%	280,021	473,591	169.12
Richest 20%	981,903	1,598,767	162.82
Total	1,433,739	2,294,747	160.05

The last type of computation pertaining to changes in income distribution, to be presented here, is an examination of the relative changes in aggregate income for each quintile. Table 4 shows that the fourth and the fifth quintile experienced the greatest growth in aggregate income during 1961-1968. The poorest quintiles showed the lowest rates of growth, substantially below the world average.

Limitations

Although the disparity between the incomes of the richer segments of the world's population and the poorer ones is very great, many students of international income distribution feel that the data somewhat overstates the gap and that adjustments should be made if the per capita income figures are to truly reflect comparable standards of living. Since we tend to view these figures with a somewhat ethnocentric eye, in that income figures are considered as relating to developed rich countries' prices and living requirements (lodging, purchased food, transportation, clothing etc.), it may be wise to consider this problem of estimation and some possible appropriate adjustments of the figures.

Many of the lowest income countries are found in warm (tropical and subtropical) climates where people require less fuel, shelter, and perhaps, caloric intake. Even when these factors are taken into account, however, it is clear that an average per capita income such as those found in the low income countries would probably not be sufficient to sustain life in the United States. The populations of those countries are, however, growing. One factor of explanation is that the figures do not fully include goods and services produced within the family unit.

Perhaps the major source of error is the use of international exchange rates for the purpose of converting the income estimates to a common basis. Hagen has suggested adjusting the incomes of the lowest income countries (roughly the poorest three quintiles in the present arrangement), by multiplying them by 3.0 and multiplying the incomes of the higher income countries by 2.5, 2.0, or 1.5, leaving the United States and Canada with unitary (1.0) multiples. This method of income adjustment is admittedly subject to a wide margin of error; however, it illustrates the fact that the method of estimating income in poor and rich countries may accentuate the already substantial amount of existing income disparity.

Another problem involves the communist countries, for which there are estimation difficulties intrinsic to the economic system itself. Perhaps a better way of defining the problem is that the criteria for measuring one type of economic system are used to measure a different one. Clearly, at least an adjustment is required to compensate for the difference in the accounting systems; however, no specific method of adjustment has been agreed upon. Exchange rates cannot be used in the same manner as with non-communist countries, since the foreign trade of communist countries is largely conducted within that group and on a bilateral barter basis. The figures used here pertaining to the communist countires relative to the United States tend to be conservative estimates of the incomes of the communist countries. Higher estimates of communist GNP (particularly U.S.S.R. figures) can be found in studies by Joseph Berliner, Stanley Cohn and the Joint Economic Committee of the U.S. Congress.

Conclusions

The types of analysis of income change presented here do not indicate that a "Decade of Development" was launched during the years 1961-1968. The poorest countries lost ground in the struggle, while the richest nations of the world increased their shares of world income and had growth rates above the world average. The concentration ratio increased between 1961-1968, indicating increasing inequaliy in the distribution of world income.

We must conclude that not only has the unequal status quo been maintained between 1961-1968, but that the gap between the poor and rich countries of the world has increased.

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A NOTE ON DISTRIBUTION OF INDIRECT TAX BURDEN BY GRADES OF INCOME IN FARM AND NON-FARM SECTORS*

THE Taxation Enquiry Commission (1953-54) had attempted a study of the incidence of Central and State indirect taxes on rural and urban households by different expenditure groups for 1953-54.[1] Subsequently, follow-up studies have been carried out by the Tax Research Unit of Union Ministry of Finance (Department of Economic Affairs) for two reference periods, 1958-59 and 1963-64.[2] These Studies have presented estimates of 'incidence' of indirect taxation for rural and urban sectors under various household expenditure groups in terms of indirect taxes per capita as percentage of consumer expenditure per capita. The results of these studies could be summed up thus: (i) All the expenditure groups in the urban sector are paying higher indirect taxes per capita, as also higher indirect taxes per capita as percentage of consumer expenditure per capita; and (ii) Among both rural and urban households, there is an increase in incidence with an increase in household expenditure size.

In this regard, as the above studies have themselves indicated,[3] the most appropriate measure of incidence of a tax on households is the ratio of its burden to household income rather than household expenditure. The drawback in employing household consumption rather than income as the base for working out incidence is that "incidence measured in relation to the consumer expenditure tends to overstate the progression or understate the regression of the tax system since consumer expenditure as proportion of income tends to fall as one

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[1] **Report of the Taxation Enquiry Commission: 1953-54** (Vol. I) (New Delhi: Ministry of Finance, Government of India, 1955) pp. 45-84.

[2] Two follow-up studies are: (i) **Incidence of Indirect Taxation: 1958-59,** (New Delhi, 1961); and (ii) **Incidence of Indirect Taxation: 1963-64,** (New Delhi, 1969).

[3] "For working out the proportions of income paid in taxes by these household groups, estimates have to be made of (a) the amount of income received and (b) the amount of tax paid by each of them. For this country, data on income received by different household groups is not available". **Incidence of Indirect Taxation: 1958-59,** op. cit., p. 4. A more detailed and emphatic observation has been made in the second study, **see Incidence of Indirect Taxation : 1963-64, op. cit.,** p. 2.

moves up the income scale ".[4] This drawback is not only applicable to the inter-class differences in tax incidence within a sector but also to inter-sectoral differences in the incidence. For, it is widely known that the saving-income ratio is lower in the rural sector than in the urban sector. Besides, the inter-sectoral differences in saving-income ratio may not be uniform at all comparable income groups in the two sectors. Available evidence suggests that the differential is higher in the large-income brackets than in the middle and lower income brackets.[5] Therefore, the differences in the incidence of indirect taxes between rural and urban sectors should be less when the incidence is based on household income than when it is based on household expenditure ; this should be particularly true in respect of the relatively large income brackets.

This note presents the results of our attempt to work out the incidence of indirect taxation with respect to household income. As a part of the comprehensive study of intersectoral and inter-class burden of taxation, an attempt was made to present an estimate of the pattern of income distribution in 'farm' and 'non-farm' sectors during the three reference periods, 1953-54/1954-55, 1957-58/1958-59 and 1961-62/1962-63. For this purpose, the basic data employed were from the very Rounds of the National Sample Survey on Consumer Expenditure which have been employed by the T.E.C. and the Finance Ministry for their studies on incidence of indirect taxation.[6] The pattern of income distribution has been derived on the lines of Ojha-Bhatt study on income distribution[7] but after taking into account the criticisms of various writers thereon.[8] For the purpose of this study, households in both the sectors are divided into three cate-

[4] **Incidence of Indirect Taxation : 1963-64, op. cit.,** p. 2.

[5] See N.C.A.F.R. : (i) **All India Rural Household Survey (Income, Investment and Saving,** (Vol. II), (New Delhi, 1965), p. 96, (Table 13) and (ii) **Urban Income and Saving,** (New Delhi 1962), p. 78, (Table 43).

[6] Except for the last period for which we had employed, in the absence of the published version of 18th Round results, the results of the Seventeenth Round.

[7] See P. D. Ojha and V. V. Bhatt: (i) "Distribution of Income in the Indian Economy : 1953-54 to 1956-57", **Reserve Bank of India Bullettin,** (Vol. XVI, No. 9, September 1962), pp. 1348-1363 ; and (ii) "Pattern of Income Distribution in an Underdeveloped Economy : A Case Study of India", **American Economic Review,** (Vol. LIV, No. 5, September, 1964), pp: 711-728.

[8] See K. R. Ranadive "The 'Equality' of Income in India", **Bulletin of the Oxford University Institute of Economics and Statistics,** (Vol. 27, No. 2, 1965), pp. 119-134. See also two more 'comments' by (i) Eva Mueller and I. R. K. Sarma and (ii) Subramanian Swamy, and 'Reply' by P. D. Ojha and V. V. Bhatt in **American Economic Review** (Vol. LV, No. 5, Part 1, December, 1965) pp. 1173-1188.

gories: (i) low-income (below Rs. 3,000); (ii) middle-income (Rs. 3,000-Rs. 25,000); and (iii) top-income (above Rs. 25,000). Corresponding to the amounts of income appropriated by the households belonging to these three categories, money burdens of indirect taxes (Central and State) have been estimated. For this purpose, the results thrown up by T.E.C. and the Finance Ministry studies are taken as the basis.

Initially, from the tax burden per capia (in Rupees) given in these studies in respect of every Central and State indirect tax and estimated farm-non-farm sectoral population, a ratio of tax burden between two sectors is derived thus:[9]

$$\frac{\text{Tax Per Capita on Farm Sector and Farm Population.}}{\text{Tax Per Capita on Non-Farm Sector and Non-Farm Population.}}$$

On the basis of three sets of such percentage ratios worked out for the three reference periods, the actual tax revenues received by the Central and State Governments during these periods are distributed between farm and non-farm sectors.

The next task is to redistribute the sectoral tax burden among the above three categories of income holders in the respective sectors. This is made possible by two sets of data contained in the tax incidence studies referred to above: (i) Tax per capita per month at different expenditure levels in rural and urban sectors separately and (ii) distribution of population by the expenditure groups. In this regard those with expenditure levels of Rs. 250 per month[10] (or Rs. 3,000 per annum) fall on the border line, for all households with expenditure less than Rs. 250/- per month (or income less than Rs. 3,000 per annum) as a group in either sector are assumed to possess no saving, as it has been done for income distribution purposes. Besides, the original studies present the data for a wider class interval of Rs. 151-300, which we have split up into two parts assuming that both the parts have the same tax burden per capita. On these lines, we have worked out the percentage ratios regarding the distribution of indirect tax burden between low income (below Rs. 3,000 per annum) and high income (above Rs. 3,000 per annum) groups of farm and non-farm sectors.[11] The details are given in Table 1.

[9] Here incidentally, it is assumed that the tax **per capita** estimated for the 'rural' sector is valid for the 'farm' population and that estimated of the 'urban sector is valid for the 'Non-farm' population.

[10] The expenditure classes given in those studies are: Upto Rs. 50, Rs. 51-100, Rs. 101-151, Rs. 151-300, Rs. 301-500 and Rs. 501 and above.

[11] High income groups compare middle and top income groups together.

Table 1—Percentage Ratios for Distribution of Indirect Tax Burden Between Low and High Income Groups in Farm and Non-farm Sectors:

Year	Farm Sector		Non-farm Sector	
	Low-income group	High-income group	Low-income group	High-income group
1953-54	62.40	37.60	46.45	53.55
1958-59	66.08	33.92	55.82	44.18
1963-64	63.61	36.39	45.53	54.67

The share of the high income groups in farm and non-farm sectors is to be further distributed among the middle and top income groups. For this purpose, the tax incidence per capita on the highest expenditure bracket of Rs. 500 and above is assumed to hold good for the top-income bracket. However, in the studies for the years 1953-54 and 1958-59, the highest expenditure bracket is given as Rs. 300 and above, and as shown by the 1963-64 study, the expenditure per capita for the group Rs. 500 and above should be higher than that for the group Rs. 300 and above. Therefore, the following method is adopted for estimating the tax per capita on the top income group during the reference years 1953-54 and 1958-59.

In the Finance Ministry's study for 1963-64, tax per capita at Rs. 31.64 for the highest expenditure bracket (Rs. 500 and above) of the urban sector worked out to a multiple of 6.35 over the tax per capita for the expenditure group of Rs. 151-300. This multiple is assumed to hold good for the studies of 1953-54 and 1958-59 also. This places the indirect tax per capita on the non-farm sector top income bracket for the years 1953-54 and 1958-59 at Rs. 9.78 and Rs. 18.99 respectively (i.e. multiples of 6.35 for the respective tax burden per capita of Rs. 1.54 and 2.99 for the households falling within the expenditure class of Rs. 151-300). Similar estimates are made for the farm sector top income households. The estimates are: Rs. 3.01 for 1953-54 and Rs. 5.77 for 1958-59.

With this elaborate exercise, estimates of distribution of total indirect tax burden by income groups are made and presented in Table 2. These results show that all the income brackets studied (low, middle and top) in the non-farm sector have paid as indirect tax higher proportion of their respective incomes than the tax paid by the corresponding groups in the farm sector. This confirms the

Table 2—Incidence of Indirect Taxes by Grade of Income

(Indirect Tax Burden as percentage of Income)

	Farm Sector			Non-Farm Sector		
	1952-53/ 1953-54	1957-58/ 1958-59	1962-63/ 1963-64	1952-53/ 1953-54	1957-58/ 1958-59	1962-63 1963-64
Low: Below 3,000	2.8	4.4	5.9	3.1	5.5	6.5
High: Above 3,000	3.9	6.5	9.3	5.2	7.5	11.1
(i) Middle: 3001-25,000	4.1	6.9	9.9	5.6	7.5	12.5
(ii) Top: Above 25,000	0.8	1.5	1.8	4.2	7.1	7.1
All Grades	3.1	4.9	6.8	3.9	6.2	8.4

results of the T.E.C. and the Finance Ministry studies, which showed that indirect tax burden in relation to consumer expenditure was higher for the 'urban' households than that for the 'rural' households at all expenditure levels. However, since these studies have related indirect tax burden to consumer expenditure, the relative incidence differentials between 'rural' and 'urban' households at various expenditure groups get over-estimated. This phenomenon is brought out in the results of relative incidence of indirect taxation presented in Tables 3 and 4. Table 3 presents our results and Table 4 those of the studies cited above. In both the tables, the relative incidence is presented in terms of a ratio which expresses indirect tax incidence on each income (or expenditure) group of the non-farm (or urban) sector relative to the corresponding group in the farm (or rural sector. The principle is that when the ratio is equal to *unity*, inter-sectoral equity is achieved in the concerned income (or expenditure) group. If the ratio is more than unity, the farm sector is relatively under-taxed and the farther away is the ratio from unity, higher is the degree of under-taxation.

Table 3—Relative Incidence of Indirect Taxation by Grades of Income (Ratio of Incidence of Non-farm Sector Groups to Incidence of Farm Sector Groups).

Grades of Income Rs.	1952-53/ 1953-54	1957-58/ 1958-59	1961-62/ 1962-63
Low: Below 3,000	1.11	1.25	1.10
High: Above 3.000	1.33	1.15	1.19
(i) Middle: 3,001-25,000	1.36	1.09	1.26
(ii) Top: Above 25,000	5.25	4.73	3.94
All grades	1.26	1.27	1.24

The following observations are discernible from a comparison of the data in Tables 3 and 4. First in respect of all income grades taken together, tax incidence of 'non-farm' sector as a ratio of the incidence on farm sector works out to 1.26, 1.27 and 1.24 during three periods under study, respectively. On the other hand, the corresponding ratio of tax incidence on 'urban' sector to that on the 'rural' sector (wih consumer expenditure as the basis) appears to be considerably higher at 2.03, 2.11 and 2.08 respectively. This shows that the T.E.C. and the Finance Ministry studies have over-estimated the tax incidence on the 'urban' sector in relation to that on the 'rural' sector. The over-estimation is found in all the expenditure brackets. For instance, for the low-income brackets (below Rs. 3,000) the relative ratio was always less than 1.25, whereas for the comparable expenditure groups (viz., Rs. 0-50, 51-100, 101-150 and 151-300) the ratio almost always stood above 1.8.

Table 4—Relative Incidence of Indirect Taxation by Monthly Household Expenditure classes.
(Ratio of Incidence of Urban Households to Incidence of Rural Households)

Monthly Household Expenditure Groups (Rs)	1958–54	1958–59	1957–58
0-50	1.64	2.32	1.91
51-100	1.88	1.97	1.90
101-150	1.96	1.95	1.85
151-300	1.82	1.88	1.55
301 and above	2.00	2.00	2.07
All Households	2.03	2.11	2.08

Note: The ratios are derived by us on the basis of the estimates of incidence presented in Table on p. 9 of *Incidence of Indirect of Indirect Taxation: 1963-64 op. cit.*

Secondly an important conclusion which the studies under reference have come to is that among both 'rural' and 'urban' households, there is an increase in incidence with the increase in households expenditure. But, when the incidence is worked out with income as the base, the progression gets eliminated at the top income group (see Table 2). In both the sectors, the top income brackets pay less indirect tax as percentage of income than that paid by the respective middle income groups. In the farm sector, while the incidence on the top income group ranged between 0.8 per cent and 1.8 per cent of income during the three periods under study, that on the low income ranged between 2.8 per cent and 5.9 per cent, and on the middle income group between 4.1 per cent and 9.9 per cent. Similarly in the non-farm sector, while the incidence on top income group ranged between 4.2 per cent and 7.1 per cent, that on middle income group varied between 5.6 per cent and 12.5 per cent.

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THEORY OF LEARNING AND THE CHOICE OF TECHNIQUES IN UNDERDEVELOPED COUNTRIES*

THE question of the proper selection of techniques of production in underdeveloped countries is a very important one. It has been widely debated but mainly in the context of the problems of capital formation and the absorption of the unemployed labour force, and in the context of given production functions.[1] Recently, however, some economists have applied the theory of learning by doing to this problem.[2] Since the rate and direction of the accumulation of technical knownedge will itself be influenced by the techniques chosen now, it is imperative that the learning potential of the techniques now being considered for adoption be appropriately evaluated. The purpose of this note is to consider the relevance of the learning by doing theory in choosing techniques in underdeveloped countries and to suggest, in a small way, the proper role of learning in the choice of techniques.

Atkinson and Stiglitz suggest that due to the possibility of localized technical progress it may pay underdeveloped countries to adopt labour intensive processes of production. Such processes may not be efficient at present but could become efficient in future through learning by doing or through research. They are of the view that in choosing techniques a firm must take into account the value of increase in knowledge associated with each technique. Further, they suggest that, "if it adopts a more labour intensive technique, then this means that the productivity of the technique will be increasing through learning while that of the capital-intensive technique will be unchanged".[3]

Economists who apply the learning theory to the choice of techniques base their views on some of Arrow's propositions regarding

* The author is thankful to Drs. Vikas Chitre and Rasesh Thakkar for helpful discussion in writing this paper. He alone is, however, responsible for all the points made.

[1] For a good summary of this see **A. K. Sen, Choice of Techniques,** (Oxford University Press, 1960).

[2] See, for example, **A. K. Sen,** "Choice of Techniques of Production with Special Reference to East Asia", in **Economic Development with Special Reference to East Asia,** edited by Kenneth Berrill (St. Martin's Press, New York, 1964); Atkinson and Stiglitz, "A New View of Technological Change", **Economic Journal,** (September, 1969).

[3] Atkinson and Stiglitz, **op. cit.** p. 576.

learning by doing. Arrow's main point was that technical progress can be ascribed to experience, that is, the activity of production which gives rise to problems for which favourable response is selected over time.[4] Technological progress is thus a cumulative and a self-generative process.

It seems to me that Arrow's style "learning by doing" is an excellent description of the manner in which technical progress continues in highly industrialized economies which have acquired considerable skill in problem solving activities. It does not seem very relevant in the case of underdeveloped countries where in many cases technical change has yet to be initiated on a modern basis. This is mainly because the process of stimulus and response, discussed by Arrow, does not operate as widely in the underdeveloped countries. If such a process in fact operated in the less developed countries, they probably would not have such a low level of technology. The facts of the matter appear different. Due to their factor endowment and due to their particular social-economic milieu, entrepreneurs in underdeveloped countries have neither found enough incentives nor felt adequate pressures to improve their techniques. This is due to a number of factors such as: (a) in many cases currently used techniques of production may be so simple that they do not help to improve the technological knowledge of the worker. A technique must have a certain minimum level of complication before it could contribute to learning by its operator. Moreover, if the technique is very simple, learning through repetition is subject to rapidly diminishing returns. In this connection, Arrow rightly points out that, "to have steadily increasing performance implies that stimulus response situations must themselves be steadily evolving rather than be merely repeating".[5] For such a stimulus-response pattern to be generated, it is obvious that the level of currently used techniques should be fairly sophisticated. (b) market imperfections in under developed countries operate in such a way as to assure a market to small producers especially those who cater to specialized tastes. Coupled with the likely existence of a backward sloping supply curve of effort, this lends to reduce the desire for improvements in the currently used techniques of production even if the worker has learned about possible improvements.

In view of the above points it seems to me that use of "learning by doing theory" for choosing techniques in underdeveloped coun-

[4] K. J. Arrow, "The Economic Implications of Learning by Doing," Review of Economic Studies, June, 1962.

[5] Arrow, op. cit,. page 156.

tries is not very appropriate. From the viewpoint of learning I suggest that government of underdeveloped countries should encourage adoption of those techniques of production which encourage the learning process either by forcing the entrepreneurs to make use of what has been learnt or by creating incentives for experimentation where possibilities of learning appear to exist. Such techniques may not necessarily fit into the factor proportions of underdeveloped countries. In some industries they may even have to be highly capital intensive. But they must necessarily be substantially more productive, immediately, than the vast majority of techniques currently being used.[6] Let us elaborate on this point further.

Assuming that a more productive technique is adopted by a firm it can have the following effects: (a) a more productive technique will, in general, reduce costs of production. It will most likely capture a greater share of the market. The more competitive the market structure, the greater is the possibility of it happening. This can then force the users of less advanced methods of production to improve their own techniques. Thus the spillovers of technical progress occur because of a fear of being squeezed out of the market. In some cases, however, in order to capture a larger share of the market, expensive distribution facilities may have to be laid down, and this may probably be quite expensive. (b) a more productive technique may have demonstrated the possibility of earning large profits. This may be an incentive to the users of less efficient techniques to improve their means of production. Very often one may find that these entrepreneurs lack immediate resources and so they may have no choice but to experiment with their existing techniques and improve them.

[6] Atkinson and Stiglitz appear to be of the view that the more productive techniques developed in advanced countries are likely to be more capital intensive and thus not suitable for the factor proportions of less developed countries. While one can be sympathetic with this view it does not appear to be entirely correct. Salter, for example, points out that producers in advanced countries, in their research and development programmes, aim at reducing cost in total, not particular costs such as labour costs or capital costs. "When labour costs rise any advance that reduces total cost is welcome, and whether this is achieved by saving labour or capital is irrelevant. There is no reason to assume that attention should be concentrated on labour saving techniques". Cf. W. E. G. Salter, **Productivity and Technical Change,** (New York, Cambridge University Press, 1960), pp. 43-44. See also Paul A. Samuelson, "A Theory of Induced Innovation Along Kennedy-Weisacker Lines", **Review of Economics and Statistics,** (November, 1965). For some empirical evidence on this point see Maddala and Knight, "International Diffusion of Technical Change—A Study of Oxygen Steel Making", **Economic Journal,** (September, 1967). The case of oxygen steel making conclusively proves that the charge of development theorists that technical change originating in the advanced countries tend to have a labour saving bias and hence is unsuitable for underdeveloped countries is not valid.

Of these two means, the threat of a loss of market might wrok as a better stimulant in many cases. Historically there is some evidence on this. According to Professor Sayers, the outstanding example of this is provided by the steam-engine, where the competition of the internal-combustion engines, particularly diesel engines, stimulated improvements. "A multitude of minor changes, applying long established principles were responsible in the twenties for results which would have been thought impossible a few years ago and which would presumably never have been attained had it not been for the ever-increasing competition of the internal-combustion engine. These developments have spurred on the designer of oil engines to further effort .... It was the stimulus of competition that kept the three main types of marine engines—the diesel, the steam turbine, and the reciprocating steam engine—in a neck to neck race through most of the period".[7] Sayers also points out that "in the field of communications the competition of radio telegraphy awoke the companies to the importance of improvements and stimulated experiments in 1920-1924 which evolved a new type of cable laid since 1924".[8]

In conclusion, it may be stated that because different techniques are likely to have different degrees of spillover effects, from the viewpoint of the learning theory, underdeveloped countries should choose techniques of production that stimulate and maximize spillovers (by forcing entrepreneurs to utilize their experience and by encouraging conscious experimentation) of technical progress. In my opinion, further work should be done to study the nature and the mechanism of the generation of spillovers of various techniques of production. However, longivity of a particular technique of production, its gestation period, the rate of surplus generated from such a technique along with likely spillovers in learning would tend to be the important factors in the ultimate selection of techniques in such countries.

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[7] R. S. Sayers, "The Springs of Technical Progress in Britain". **Economic Journal**, (June, 1950), pp. 284-285.

[8] **Ibid.**

REVIEWS

Britain and America 1950-1939—A Study of Economic Change, by Philip S. Bagwell and G. E. Mingay, Routledge and Kegan Paul Ltd., 1970, pp. 312, £ 2. 2s net (£ 2.10).

This new volume in the studies in economic history is an excellent survey of the comparative economic development of Britain and America. It gives a comprehensive account of the economic and social progress of the two countries between the period 1850 and 1939, a period of rapid industrialization and social change. The list of the chapter headings beginning with the 'British and American Economy in the 19th Century', 'Internal Transport', 'Agriculure', 'International trade and the movement of factors 1850-1914', 'The Money and Capital Markets', 'Industrial Developmens 1850-1914', 'Trade Unions', 'Social Progress 1850-1939', 'The Atlantic Economy 1914-29' to the 'Nineteen Thirties' fulfill the promise given by the title of the book.

The first chapter mainly deals with the survey of the state of economies of Britain and America during the 19th century and explains the process of growth and structural changes in the two countries between 1850 and 1950 with the help of statistical tables and graphs. The authors give an elaborate account of internal transport, mainly railways, their economic effects and the role of government policy in the growth process. It is followed by a detailed survey of the differences in agrarian structure in the two economies and the effect of agricultural growth on the economic development of the two countries.

Chapter 6, entitled 'Industrial Developments 1850-1914', gives a relative picture of the growth of old industries such as staple industries, cotton textiles and coal mining industries and the establishment of new industries viz., steel production, machinery and ship building etc. One third of the chapter is devoted to explain the retardation of growth rate of real G.N.P. in Britain and especially in its industrial production.

The authors seem to be interested not only in the economic aspects of the two economies. Chapter 8 compares and contrasts social problems such as class barriers, unemployment, squalor and disease and the progress made in this direction by the two countries. The idea of social progress has been admirably related to the growth

of the national wealth and the standard of living. With the help of statistical data the authors show that during the middle of 19th century there were serious social deficiencies and wide-spread poverty in both the economies. These were only partly removed in the early 20th Century.

In addition to explaining the growth of international trade, factor movements, the effectiveness of trade unions, the role of money and capital markets, the book ends with the origin and the characteristics of the crisis of 1930's and its effects on the two economies. Amongst the individual topics the authors are more concerned about the economic effects of Civil War, of railways, of the movement of labour and capital in the international market, of the Great Depression of 1930's and of the Policy of New Deal.

But one important aspect of economic development which has not been elaborated by the authors is the role of fiscal policy in the two economies except a casual reference to income tax in chapter 4.

In the Preface to the Book the authors state, " this volume is something of an elementary pioneer effort in comparative economic history ". But in the opinion of this reviever, even though they have not touched the fiscal aspect of the two countries, they are far too modest in saying this. They have admirably succeeded in giving a clear comparative picture of Britain and Ameria over a period of about a century. The vast number of statistical tables, charts, graphs, notes and references in the texts at the end of each chapter make the book indispensable for those interested in comparative economic history.

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Events, Ideology and Economic Theory, ed. Robert V. Eagly, Wayne State University Press, 1968, pp. 205, $ 8.50.

This book contains a collection of six papers presented at a Symposium held at Wayne State University in May, 1966, under the academic leadership of R. V. Eagly. The specific issue under study is the Relativity hypothesis of Economic Theory—the impact of events, environment and ideology on the evolution of economics as a theoretical discipline. It is a matter of controversy whether ideas emerge as a result of external factors or of internal factors germane to the logic of an inner dialectic of a particular science. The overwhelming judgement, based on empirical analysis, seems to be in

favour of the impact of environment conditioning the mode of thought. It is linked to the tradition of sociology of knowledge as Marx envisaged in his famous proposition that "social existence determines mental consciousness". J. S. Mill's dictum that practice precedes theory is apt to be in the same tradition of thinking. Recently Prof. J. R. Hicks has emphasised the fact that the large part of the best work on money is of topical interest being prompted by particular episodes of the experiences of these writers at that time. The revival of monetary policy and the resurgence of interest in monetary theory in the post-Second world war period, in the context of secular inflation provides added significance to the relativity hypothesis emphasising a close link between events and ideas. E. H. Carr (What is History ?) underlines the same concept in relation to history, and observes, "Before you study the history, study the historian. Before you study the historian, study his historical and social environment". The book under review, however, is confined to the impact of environment on economic theory and the scholarly analysis is highly rewarding to any keen student of economic thought.

In order to examine the impact of events on ideas, the following six topics are discussed : 1. The case of the French Physiocrats (R. L. Meek). 2. The Sweedish and Englsh Bullionist controvercies (R. V. Eagly). 3. Mercantilism (W .R. Allen). 4. Karl Marx and Industrial Revolution (P. M. Sweezy). 5. Keynesian Theory (K. K. Kurihara). 6. Post-1870 economic thought (J. J. Spengler). Eagly in the first paper makes a comparative study in the background of the Swedish and English controversies represented by Christiernin in Sweden and Thornton in England. They indicate similarity in their interpretation of the determinants in the context of rising prices depending on paper money. In conclusion, a rather strong case is put up for believing that the co-relation does reflect a causal linkage. Prof. Meek, in examining the case of Physiocrats, admits that environments do not have ideas and cannot write treatises on political economy. But they can and do provide such fundamental problems for men to solve. The problem suggested in this context was one of development for mid-eighteenth century France and the strategy was for developing large--scale capitalist farming. Sweezy argues that Marx's conceptualisation was based on modern machine industry. With Marx, the dynamic development of machine industry and the complex technology associated becomes for the first time a major factor of consequence. Since technological change is highly unstable, Marxian theory of development is rather disruptive in contrast to the

Classical concept of a smooth and cumulative change. W. R. Allen presents rather a "weak case" of historical relativism in evaluating mercantile system. In the Keynesian revolution in economic thinking, as an outcome of the great depression of 1930's Kurihara could find a link between events and ideas. But in the latter part of his paper, in unfolding the Keynesian system, it is suggested that economic analysis progresses primarily by the questions posed as a logical sequence of the defective structure of existing theories. This supports the "endogenous" explanation in the evolution of economic science. Spengler develops further the "endogenous case" for explaining the progress of post-1870 economic thought.

Spengler observes that after 1870, the development of economic theory becomes largely impervious to the impact of external events or environment. It is partly due to the professionalisation of economics as a science and partly due to the very nature of the discipline's formal theoretical apparatus. He is therefore, inclined to argue with Stigler that "the dominant influence upon the working range of economic theorists is the set of internal values and pressures of the discipline". But Eagly replies that since 1870 economists have constituted their own social circle with their own audience. Thus production of economic knowledge is closely linked to the incentives provided by the profession. At the same time the functioning of the social circle and the consequent structural transformation positively effected the formation of ideas or tools of economic analysis. In this context, it is also relevant to remember Werner Stark's analysis of the genesis of economic theory in his History of Economics (pp. 55): "What is it that gave birth to the atomistic conception of society as the consequence of which the attemp to advance from individual psychology to market analysis must be understood ?".

"It is easy to find an answer to this question. Never was society nearer to the state of perfect competition than in the years in which the utility theory of value arose—never, in fact, was it more a sum of independent individuals. There was as yet hardly protective tariffs for the peasants, hardly cartels for the entrepreneurs, hardly trade unions for the workman". Further he says that in all the phases in which political economy has passed, "it was a faithful reflection of social reality". This may be an extreme view. But the fact remains that there is a social tie between events and ideas and the science of man cannot be separated from the problems of man.

Tiruchirapalli S. C. JOSEPH

Paper and Pulp: Prospects for 1975, Economic and Scientific Research Foundation, New Delhi, 1969, price Rs. 10.00, pp. 161.

This study, by the Economic and Scientific Research Foundation of the Federation of Indian Chambers of Commerce and Industry, tries to project the supply and demand requirements of paper and pulp for a period upto 1975.

The major part of the demand for paper is expected to be generated as a consequence of the spread of education and improvements in literacy, adoption of 'modern methods' of marketing and from the government administration. With the improvements in education and the 'political awakening among the people, the study finds that the demand for newsprint has been increasing, and in this increase, the demand "for special varieties is gradually expanding". There has been also an increase in the demand for "industrial papers". However, the nature of demand for this category has not been spectacular, owing mostly to the "slow growth of consumer industries, enforced by the investment strategy of the three plans..." And according to the study, "this explains why during the last fifteen years there has leen no marked upsurge in the rate of growth of demand for paper.

Although the demand for paper is dependent upon numerous factors, the study has based its demand projection on the assumption of a 'close relationship between income and consumption' of paper. On this basis, the study gets the result that the *per capita* demand is expected to be more than doubled from 1.4 kg in 1965-66 to 3 kg in 1975-76 and that the aggregate demand would be 1875 thousand tons in 1975 as against 678 thousand tons in 1965-66.

The demand for paper would largely be dependent on the spread of education and the demand for industrial papers such as those for packing materials. If the constitutional requirement of implementing compulsory education at the primary stage is seriously taken as a policy measure for implementation by the state governments and if there happens to occur something like an 'educational explosion' in India in not far off future, the demand for paper for educational purposes would certainly be greater than what the author has projected for. Likewise the likely development of many consumer industries at a rapid rate which use industrial papers as packing material is also likely to push up the demand for this category of paper. The 'sluggish demand for paper', in the late sixties which the study emphasises may be considered as a transitory phenomenon, in the

light of the findings that the 'income elasticity of demand for paper has gone up from 4 during the first plan period to 5.4 during the third plan period.

However, the study finds that the 'over all situation is not encouraging'. This pessimism is generated by the investigation of the factors influencing the supply position regarding pulp. The study is of view that India "is supposed to possess a huge potential of cellulosic material'. But yet, the paper industry uses only a small portion of this material, which is its essential raw material. This is because of the 'prohibitive cost' of producing pulp from bamboo and other raw materials. The study gives how the magnitude of the cost of production has been rising since 1956. In the opinion of the author of the study, the remedy lies not in "superficial gimmicks" like the "proposed entry of the public sector into this industry", but in measures like "rational pricing of forest products, intensive plantation programme, a multiproduct approach to resource utilisation and development of the industry on the lines of "Mother Pulp" and "Baby Paper Mills" etc.".

As paper is one of the essential consumer commodities, and the demand for it is likely to increase at a very rapid rate with the increase in literacy and improvements in the general standard of living, the findings of the study under review need to be carefully gone into, particularly with respect to the planning and development of our forest resources, which serve as raw materials for the industry.

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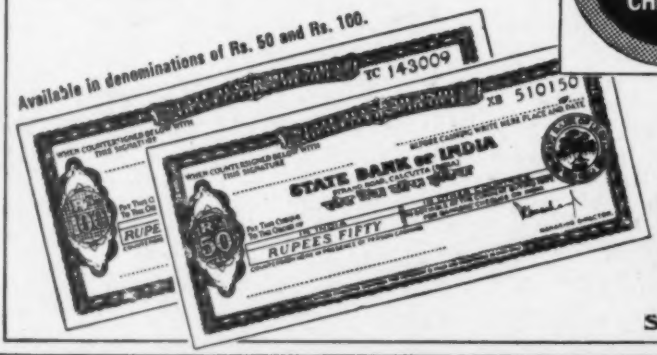

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